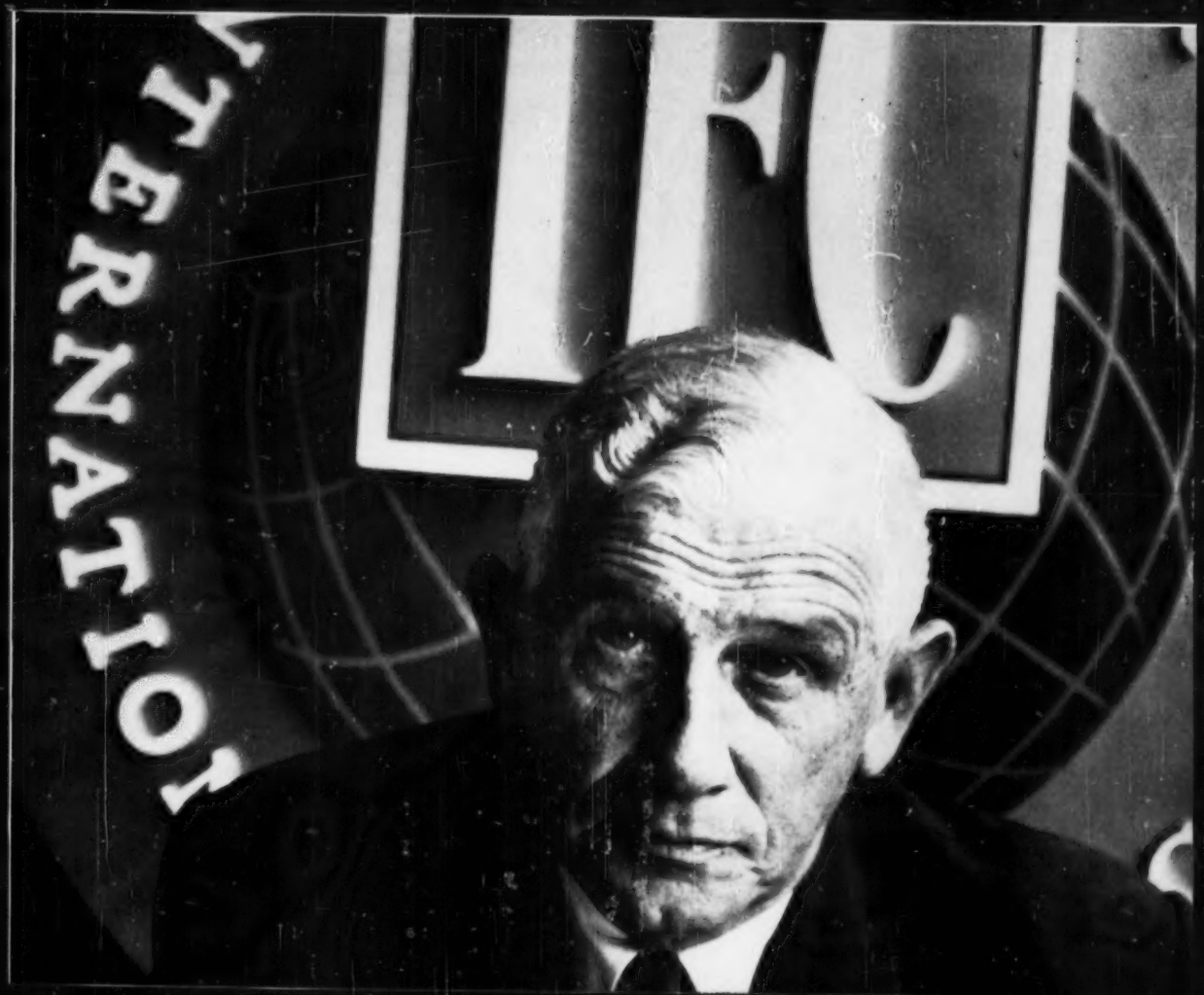
INTERNATIONAL

Management Digest

TECHNICAL • INDUSTRIAL • COMMERCIAL



So Easy to Set the TV Set...

New push-pull switch, engineered by Mallory — lets you turn your set on and off without need for readjusting volume.

JUST snap out the control knob and sit down to enjoy yourself. No need to wait for the set to warm up so you can adjust volume.

Mallory's new push-pull switch and volume control enables you to turn off your set without disturbing the volume adjustment. And that means no adjustments are needed when you turn the set on again.

This Mallory combination control and switch is making its appearance on new television receivers, and in automobile and home radios, too. Its added convenience means greater listening and viewing pleasure for the user . . . and extra sales appeal for the manufacturer. It will set the same standards of long, dependable service that other Mallory electronic components have already established in television and radio . . . as well as in radar, guided missiles, computers and the countless other electronic wonders that are behind today's industrial and military progress.

If your interest lies in the industries which Mallory serves . . . such as appliances, aviation, automobiles, electronics . . . we invite you to see how you can profit by our extensive experience and products, in the fields of electronics, electrochemistry and specialized metallurgy.

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Allis-Chalmers equipment in vanguard of great Peruvian Mining Project

An Allis-Chalmers HD-21 torque converter tractor, working in the extremely rugged and dusty conditions of the mining area. It is doing rough grading for camp site near Incapuquio, at an elevation of over 2,440 meters (8,000 feet).

One of the world's great copper mining projects is getting under way high in a remote area of the barren Peruvian Andes.

The Southern Peru Copper Corporation's ore deposit, locked in a mountain area 3,500 meters (11,500 feet) above sea level at Toquepala, is estimated at 400,000,000 tons. Approximately 190,000,000 tons of overburden — rock, gravel, etc. — must be stripped off before actual production of copper ore can begin.

Fleets of Allis-Chalmers diesel crawler tractors, bulldozers, gradebuilders, tractor shovels, loaders and pipelaying equipment are already at work on the early pioneering stages. The vast preliminary preparations include carving the necessary road system out of mountainsides and desert approaches; building a railroad 225 kilometers (140 miles) long with an average grade of 3 percent; laying a pipe line 100 kilometers (62 miles) long to bring water to the area of operations; constructing housing sites and electric power facilities.

The large number of Allis-Chalmers units chosen to start initial work is impressive evidence of the confidence the contractors placed in Allis-Chalmers dependability and performance.

The name Allis-Chalmers on heavy-duty earth-moving equipment is a symbol of superior quality, modern design and operating efficiency — recognized by construction engineers in all parts of the world.

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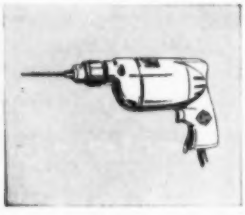

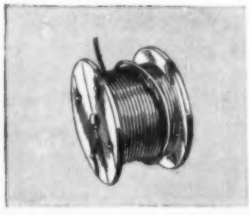

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Management Digest®

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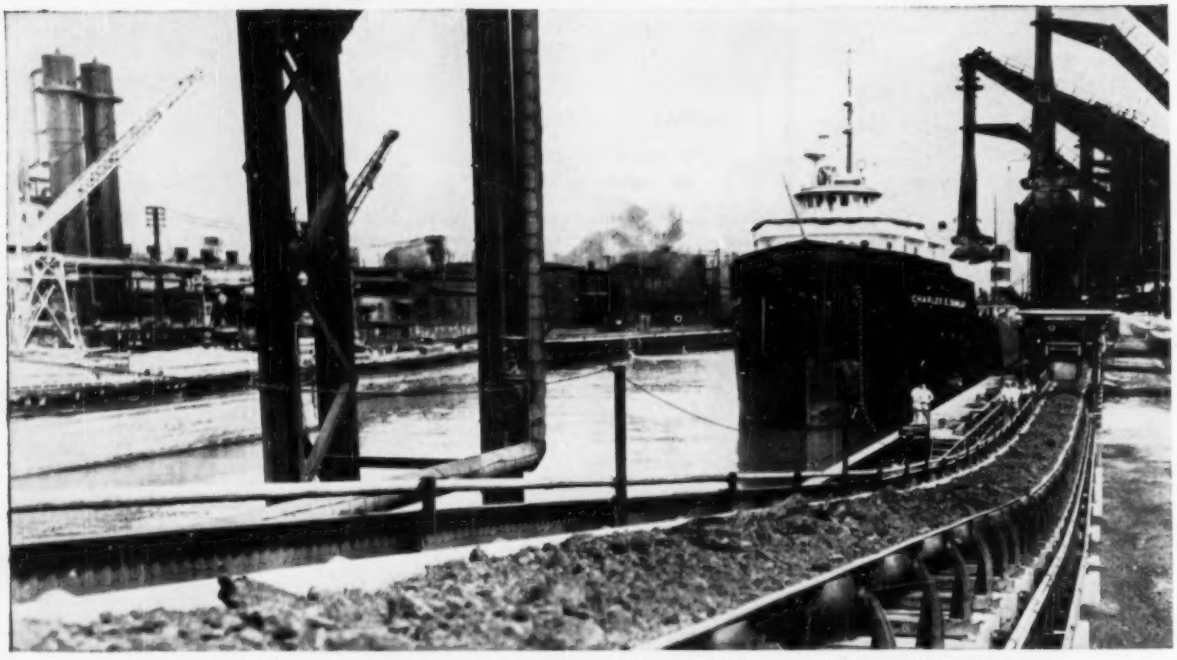
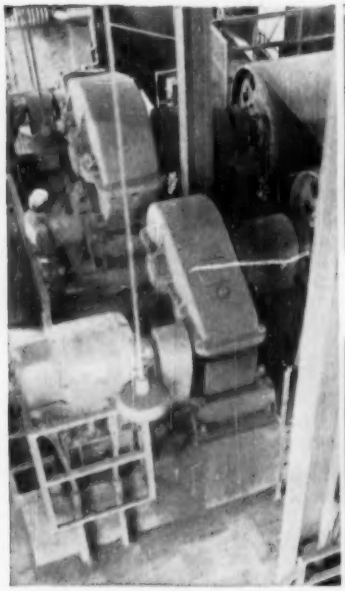
Here's another complete ore handling system

designed, built, erected by LINK-BELT



Transporting iron ore to storage at 6000 tph, this 1260-ft. Link-Belt conveyor travels at 500 fpm. Series 200 impact idlers are used along 500-ft. loading area. This 60-in. wide belt also handles coal and limestone.



Power for reversible storage belt conveyor is delivered through Link-Belt parallel shaft drives.

Link-Belt traveling tripper-stacker on distributing belt conveyor stacks coal on the right, ore on the left.

This 60-in. wide Link-Belt belt conveyor is inclined 16½ degrees and delivers to screen house.

Eastern mill delegates responsibility for conveyors from docks, to and from storage, to blast furnaces

PAST experience with the efficiency of similar Link-Belt bulk materials handling systems prompted a repeat order from this eastern mill of a major steel company. Today, in mills throughout the country, Link-Belt conveyors are providing efficient, economical handling of iron ore, coal, sinter and limestone.

When you rely on Link-Belt for one-source service, we accept full responsibility for placing your system in successful operation. Link-Belt engineers will work with your consultants and engineers to give you a bulk handling system built to your exact requirements. For complete information, call your Link-Belt representative. Or write us direct. Address Dept. 157-MD.

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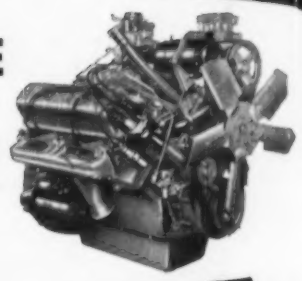

Real payload power—257 hp. and 37,000 lbs. GVW—in the new International 6-wheel VF-200 dump.

Here's big news for truckers! International, the world's most complete line of trucks, now brings you a new heavy-duty V-Line! Super-powered by *the first all-truck designed* V-8 engines, the V-Line is available in a brilliant new series of four and six-wheel conventional and cab-over-engine models.

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Remember, International builds the right truck for your job—the 6-cylinder models of the famous R and S-Lines ranging from pickups to extra heavy-duty giants, plus the all new heavy-duty V-8 Line. See your IH dealer and get the facts about the trucker's choice . . . International!

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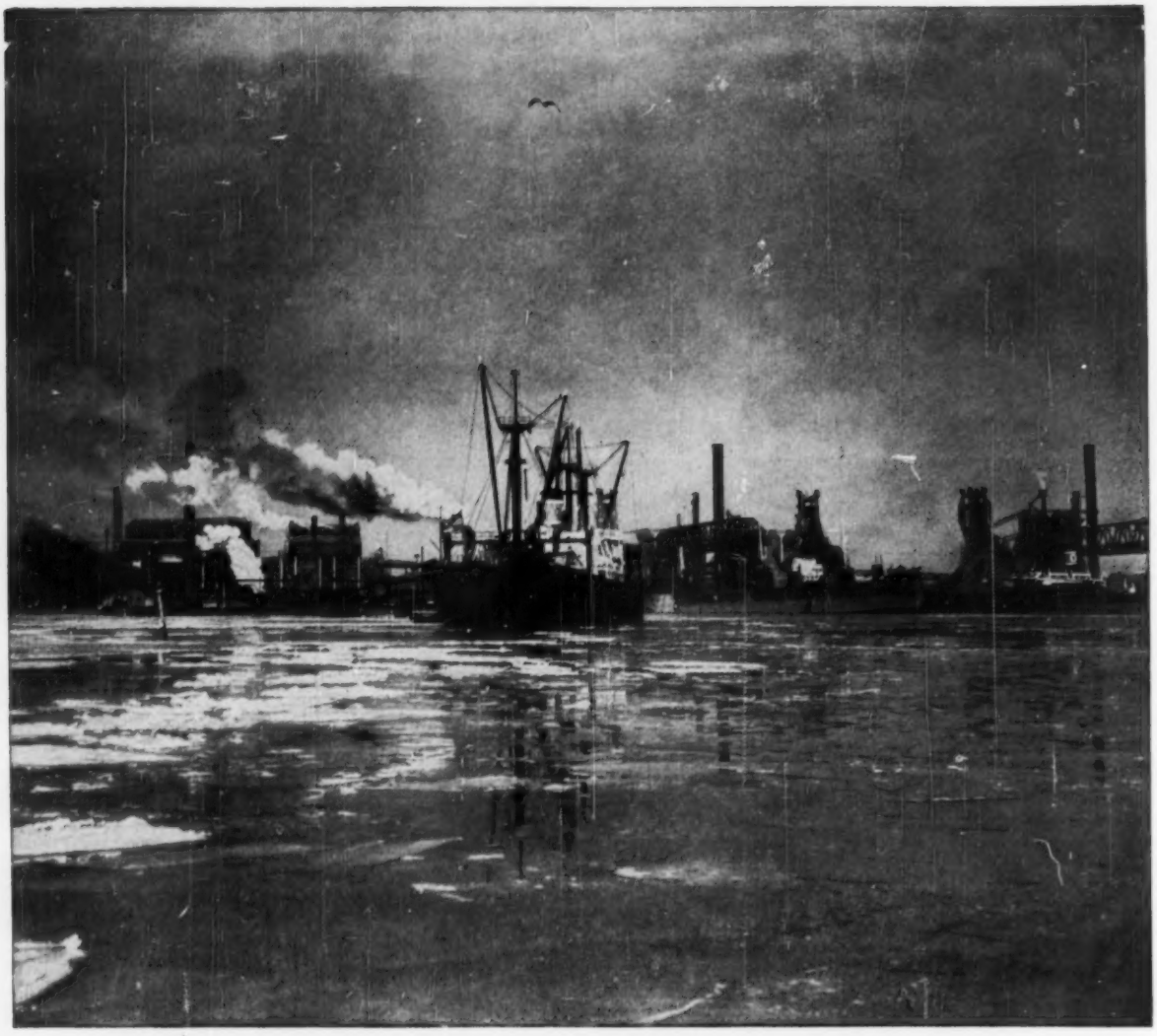

Bethlehem Buys from the World

To help make its millions of tons of steel each year, Bethlehem imports raw materials from 41 countries around the globe.

We must have, for example, such products as chrome, tin, tungsten, manganese, fluorspar, hemp, rubber, paper pulp, and chemicals. Some of these actually go into the steels we make; others are required for plant operations that contribute to steel-production.

You know Bethlehem as one of the foremost producers of steel and steel products. But think of Bethlehem, too, as a large-scale customer in many different markets all over the world. Bethlehem Steel Export Corporation, 25 Broadway, New York 4, U.S.A. Cables: "BETHLEHEM, NEWYORK."

Bethlehem's great Sparrows Point plant in the Port of Baltimore, U.S.A., is the world's largest steel mill located on tidewater. Products for export can be loaded from this plant directly aboard ship.

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WORLD TRENDS

WHAT KIND OF BRITAIN?

Even the most patriotic Britons realize now that the Middle East fiasco has speeded their nation's decline as a major world power. There is deep soul-searching about Britain's future.

Should Britain cut its heavy defense spending, reduce its colonial and Commonwealth responsibilities and its commitments to alliances—eventually becoming a "neutral" manufacturing nation like Sweden or Switzerland? Or should Britain struggle and strain to remain a great power—with the economic and political burdens that the role entails?

The debate continues. THE ECONOMIST puts the case against a radical reduction of commitments in vivid terms: "If Britain decided to become another Sweden or Holland—and if no other country became another Britain, in its role as the most experienced pilot fish to lead the protective big American fish to the threatened peripheries of the non-Communist world—there might be no more Swedens or Hollands at all."

The British people do see a promising future in the larger framework of Europe. Businessmen, trade unions, politicians, economists—all agree that Britain cannot stay out of the plan for a free trade area linked to the six-nation Common Market on the Continent. Chancellor of the Exchequer Macmillan believes that the tariff-free single market could be operating in just 10 years. The oil crisis has reinforced his view, and that of most Europeans, that economic integration must come—and soon.

The economic outlook in Britain was a bit more hopeful at the turn of the year. The U. S. A. seems determined to help support sterling; the pound seems safe until Spring, at least. London officials think they may be able to balance their payments on current account.

British businessmen are mustering their resources. A new dollar area export drive is underway. And leaders of the business community are trying to set an optimistic tone. One industrialist—Sir Leonard Lord, chairman of the giant British Motor Corp.—insists that BMC must continue its ambitious long-term expansion plan. "The world is still hungry for autos," he said, "and we must spend to insure the future."

IMPETUS FOR THE ATOM

Expect urgent new impetus behind nuclear power development in 1957. The Middle East oil shut-down will accomplish that, if nothing else.

The six-nation Euratom plan (watch for a Euratom report due this month) takes on new significance. And you will hear more about a proposal of John Jay Hopkins, influential chairman of General Dynamics Corp., the U. S. firm that built the first atomic submarine.

Hopkins urges immediate action—a "massive cooperative effort on the part of free-world industrialists"—to create an atomic pool of non-Communist nations in Asia, the Americas, Europe, Africa, and the British Commonwealth. He would model it after the North Atlantic Treaty Organization, try to make it a flexible, fast-moving economic and technological alliance. Hopkins made this telling point: The "geological time limit" for

Turn the page for more WORLD TRENDS

dependence on oil as an energy fuel is a scant 20 years. But the "politico-economic time limit" may have already expired.

Note these other atomic power developments: Washington has substantially cut the price of the reactor fuel it will sell to foreign nations, and has taken other steps to speed development. American & Foreign Power Co., operating in 11 Latin American nations, announced that it will install its three, much-talked-about, 10,000 kilowatt atomic power plants in Brazil, Cuba, and Mexico. (These plants will supplement A&FP's five year expansion program calling for expenditure of $47-million in Mexico, $147-million in Cuba, and $250-million in Brazil.)

TRENDS IN TECHNOLOGY

Aluminum: Anaconda Co. of the U.S.A. is betting $1-million that it can economically extract alumina, the oxide from which aluminum is made, from common domestic clays, rather than imported bauxite. A pilot plant will be ready later this year. The process is reported to involve leaching and high-pressure filtration of "low-grade" clays—50 tons of clay to yield 10 to 14 tons of alumina daily.

Meanwhile the world search for bauxite ore continues. Australia's Cape York peninsula, Hawaii, and French West Africa are being heavily prospected. One American aluminum producer looks to Japan as a source.

Distilled sea water: E. I. du Pont de Nemours and the U. S. government will build a prototype solar still made of plastic. Du Pont believes it has a plastic (Teflon fluorocarbon resin) that will withstand weathering for as long as 10 years. The partners think the still could be erected for less than $4 per square meter, that fresh water could be produced for less than $0.19 a cubic meter.

Aircraft fuels: Chemical engineers are looking beyond gasoline and kerosene as fuels for tomorrow's aircraft. They are specifically interested in chemical fuels such as the hydrides of lithium and boron. These promise tremendously increased power, payload, and range. For the present, however, the project is a military monopoly.

Papermaking: A newly-perfected continuous process for pulping bagasse (sugar cane waste) is the basis for W. R. Grace & Co.'s $46-million paper mill expansion in Latin America. Called the "Peadco" process, it cuts pulp cooking time from several hours to minutes. Grace says the pulp is of more uniform quality, and can be run faster, and to higher yields, on modern paper machines. (See page 17 for more on papermaking.)

Steelmaking: The restless steel men are working on a number of ideas that may yet make the blast furnace obsolete. Most of the processes, to be sure, are not yet commercially feasible.

- The British Iron & Steel Research Assn. is going ahead with work on a process that takes fine droplets of liquid ore, blows them through a mixture of oxygen and powdered coal. The problems: how to contain the high temperatures necessary; how to collect the crude steel produced.
- Germany's Hoesch Werke is experimenting with metal fuels (based on silicon and aluminum) to get steel directly from ore. Some work is being done on atomic smelting. Both are admittedly long-range projects.
- The U.S.A.'s Hydrocarbon Research Inc. and Bethlehem Steel Co. have a pilot plant in operation that reduces ore to sponge iron with hydrogen. The advantage: flexible iron production at low-cost, wherever there is gas, oil, or ordinary (non-coking) coals.

See page 25 for more "trends in technology"

NEW YORK CITY
JANUARY 1957

Some Thoughts for 1957

THIS MUCH IS CERTAIN: 1957 starts out as an uncertain year for business. New political forces generated in the past few months could radically change the structure of the world economy. We discuss some of the possibilities on page 11.

Magazine editors are no more able to predict what will happen than are economists, managing directors—or even taxi drivers. We are wary of advice to business that assumes that everything will settle down to a status quo ante.

And we are equally wary of those who tell businessmen to plan on the likelihood of war, or the inevitability of greatly increased price inflation. For businessmen to act on such an assumption would mean a fierce bidding-up of prices, top-heavy inventories, and generally more problems than before.

The advantages of such a policy would be short-lived. It would put a business into a dangerously inflexible position, unable to take advantage of fast changes in the economic weather. A better stance for management is to remain flexible and well-informed, unmoved by neither dark pessimism nor wild optimism.

Then there is the matter of the business community's public responsibility. Ill-advised, selfish action serves neither a company nor the nation in which it operates. Our cover personality —Robert L. Garner, of the International Finance Corp.—stressed this point in Santiago, Chile (page 15). His words are particularly applicable at a time when business confidence has been shaken.

Management, Garner declared, has a "self interest and a responsibility" to use its influence to promote public stability and orderly administration—"even at the sacrifice of some immediate personal advantages." Business must do much more to prevent widely fluctuating currencies, unbalanced budgets, erratic administration, capricious policies in government. This is more than a public duty. It is also good management.

Robert Garner went on to talk about another essential of good management. He believes the unique element in a healthy industrial system is that each producer strives to reach a larger number of customers, constantly reducing costs so that more people can afford to buy. The system that does not include a good many of producers with that goal is unlikely to enjoy sound growth.

Looking back over the history of technological development—as MANAGEMENT DIGEST does on page 32A—you cannot help but be struck by man's inventiveness. Yet implicit in this history is this thought: Even the most inventive society cannot prosper unless individual human beings enjoy a rising standard of consumption.

The world can see the proof in several areas of today's world, and especially in the Communist empire. The rulers of Eastern Europe seem to have forgotten that the end of production is consumption— human consumption of the better things of life. This seems to be a basic law of history. The rulers ignore it at their peril.

Time of change, however violent and unsettling, offers great opportunity—for settling old grievances and charting new progress. With this hope in mind, MANAGEMENT DIGEST, and the entire staff of McGraw-Hill, wish you a progressive and prosperous 1957.

Paul R. Miller, jr

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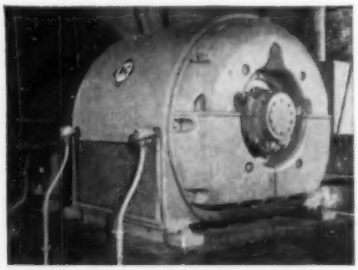

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Management Digest

For 1957: The World in Flux

IN EUROPE: A cold winter, oil troubles—with fast-changing industrial and market patterns.

IN ASIA-AFRICA: Delays, shortages, and new suppliers bidding for trade. Less capital—more politics.

IN THE AMERICAS: Better business, higher prices as U. S. prosperity helps stabilize the world.

These widely separated, but intimately related events were taking place as MANAGEMENT DIGEST went to press:

- The British Treasury was straining to support sterling, asking for—and receiving—American help.
- Trucking rates in France were rising sharply; Paris pedestrians noted a decreasing swirl of traffic around the Arc de Triomphe.
- European bankers were sending clients' capital to North America—enough, apparently, to help raise the Canadian dollar's premium over U. S. currency to a 22-year high.
- Canadians themselves were showing new interest in the oil potential of their vast, untapped Athabaska tar sands. Canadian soapmakers, buying coconut oil from the Far East, were thinking about higher prices.
- Swedish pulp producers, heavily dependent on oil, knew they faced major production losses this winter; a chill crept into oil-heated apartments in Stockholm.
- Asian buyers wondered when they would receive the hundred thousand tons of steel and engineering goods lying on Genoa quays for lack of ships. And some shipping experts suggested that, by mid-January, freight rates might be 40% above what they were before Suez.
- Latin Americans wondered whether higher prices for their raw material exports would balance the higher prices they may have to pay for oil, and machinery.

It all adds up to a kaleidoscope of change and uncertainty, of shifting trade and investment patterns around the world. Rarely has the businessman's long-term planning been more difficult.

I. Time is the Key

Time is the key to the crisis in Europe. If the Suez Canal and the pipelines are open in three months (the most optimistic possibility), Western Europe will get through the winter with some shivering, gas rationing, moderate unemployment, a drain on dollar reserves. If the canal is blocked very much longer, Western Europe faces a grave industrial, social, and financial crisis. Even with large-scale American assistance, and an early canal opening, Europe is due for a bad winter.

At the same time, political forces generated in the past few months—the crisis within the Soviet empire, the eclipse of British and French influence in their former colonial territories—could radically distort the structure of world business.

Over the short term, the upheaval in Eastern Europe will cost the Russians money—for military operations, for reconstruction in Hungary, for lost production, and for aid and bribes to the Poles and other satellite peoples. Longer-range, the chances of expanded exchange of goods, technology, and services with the non-Communist world have dimmed. Also, the Soviets risk losing the extra productivity they hoped to gain in the "de-Stalinization" process. Soviet industrial managers especially felt the nation had much to gain through more liberal policies.

True, there may be a bit more western trade (and aid) with Poland, and perhaps other East European nations. But overall, there is not much promise of greatly expanded East-West trade in 1957.

The economic crisis in Europe will have much more wide-spread repercussions. Within six months, Europe will have lost roughly $700-million of reserves because of increased imports of Western Hemisphere oil alone. The indirect effects of the oil crisis on Europe's ability to produce for export, and thus on its future balance of payments, are difficult to estimate.

Already there is a complex interplay of trends. Inflationary winds and deflationary winds are sweeping Europe simultaneously. Governments are not sure which force is likely to be stronger in six months time, and are trying to plan monetary policies to meet either situation.

The greatest alarm concerns the situation in Britain. Britain's own dependence on oil has grown due to (1) industrial expansion, (2) higher standards demanded by consumers—more autos for example; and (3) an inadequate supply of coal to support such expansion. While the immediate effect of an oil shortage on Britain is undramatic (most plants have coal-burning equipment; power stations and railroads run on coal), the gradual, cumulative effect of shortage will cause dislocation, for one industry after another, in January and February.

Perhaps more serious is the effect of crisis on sterling, and Britain's role as an international banker. Britain suffers most from the oil shortage on the Continent—simply because the British are the principal sellers of oil there.

Above all, there is the question of "confidence in sterling." In November, sterling exchange rates dropped as governments and individuals quietly sold in world money markets. For some time, the Indians, Pakistanis, Ceylonese, even Australians have been building up their dollar balances. If doubt as to London's future as a

world banker ever really took hold, British reserves could lose $500-million in just a few days. This is something the U. S. A. government fears almost as much as the British do—and Washington is determined to help defend the pound.

II. The Effect on Trade

The repercussions of Europe's troubles on the rest of the world cannot be forseen until the final dimensions, and duration, of the crisis are clear. But you can make general observations.

If Europe buys more oil from the Western Hemisphere, it will buy less of other things. There is a possibility that falling dollar reserves may force Britain and France to reimpose direct controls on dollar area imports. That could lead to new quotas on intra-European trade—and set back five years of progress toward liberalization. Note, however, that the British are now fully behind the plan for Common Market on the Continent, with an associated free trade zone which London would join (page 7).

British markets in Asia, and to a lesser extent other European markets there, are threatened both by increased transport charges and by weakening sterling area ties. The Japanese, perhaps the Americans and Canadians, are expected to gain in Asian markets at the expense of Europe. Political problems in the Middle East, and the sharp drop in that area oil revenues, will probably reduce sales there by all exporters.

Latin America can expect a good year, however. The 20 republics will be able to take advantage of a strengthening demand for metals, particularly in the U. S. A. Falling coffee sales in Europe should be more than offset in North America. Meanwhile, the signs point to a significant increase in North American investment in Latin America—especially in oil and minerals.

III. A Prosperous U.S.A.

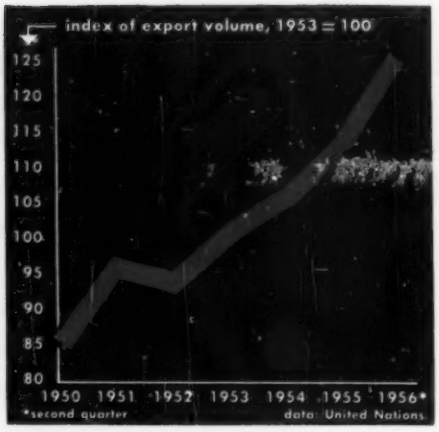
Prosperity in the U. S. A. is likely to hold right through 1957—and will be a powerful stabilizing force in the world economy. The gross natural product is expected to rise at least another 5% in 1957. Imports are headed toward the $14,000-million mark, responding to increasing industrial and defense spending (the arms budget could rise by as much as $1,800-million to $5,000-million—depending on world events). Meanwhile, American commercial exports are expected to hold steady at an annual rate of perhaps $17,000-million—with any drop in sales to Europe balanced by increased sales in Canada, Latin America, and the rest of the world.

The U. S. A. will continue to share its prosperity with the rest of the world. Foreign economic aid spending will not rise much above an annual level of $1,800-million. But beyond that, bigger aid programs in the Middle East, Asia, and Africa—now only in the planning stage—could push the total higher by the end of the year. The Export-Import Bank's lending will show a continual rise.

Washington will keep the pressure on private capital to venture abroad, to develop new sources of raw materials and new markets. The net outflow should pass the $3,000-million mark in 1957. But investors will be much more willing to invest in Canada and Latin America, less anxious to risk money in Europe and Asia.

The Administration evidently plans to continue to send U. S. farm products overseas; surplus disposal may rise to $1,800-million by the end of the year. This will bring charges of "dumping" by other agricultural nations. But Washington intends to stick to its program, arguing that surplus disposal means a net transfer of U. S. wealth abroad, that it stimulates development through foreign currency loans, that it helps other agricultural exporters by creating larger markets for all.

President Eisenhower seems equally determined to hold the line on tariff policy—and has served notice that he will ask again for Congress' approval of the Organization for Trade Cooperation. But the chances for any significant reduction in trade barriers are dim; protectionism is rising, particularly in the U. S. South. There is one bright spot in the trade policy outlook: Quotas on U. S. imports of metals and oil are now much less likely. ●



Add the rising volume of trade . . .

After Suez:

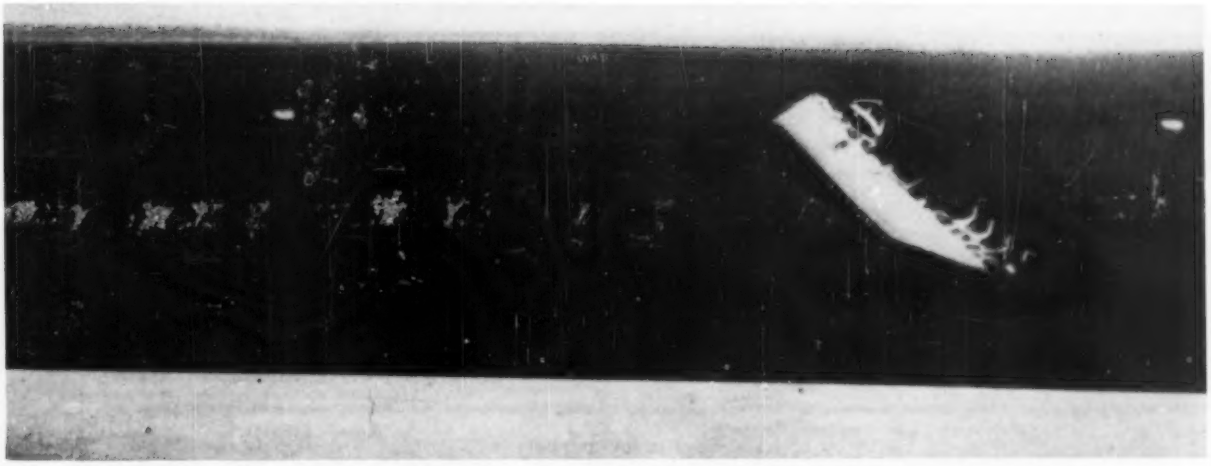
Cargo space is scarce. Freight rates are climbing. Prices of old ships are high; new ships will be costlier as shipyards bustle with activity, and try to buy up more steel and more technicians. Naval architects and engineers are working overtime on new designs, more efficient cargo handling techniques and propulsion systems. Everywhere, buyers and sellers of imported goods are meeting delays and troubles.

But do not blame all the bustle, and the delays, solely on the closing of the Suez Canal. And do not expect the shipping shortage to suddenly lift when—and if—the canal is opened.

The shipping shortage comes from adding the canal blockade on top of an already booming demand for cargo tonnage, in turn the result of the steady rise in world trade volume (chart above). The shipping squeeze is not just confined to the routes that normally use the canal. Nor is it limited to tankers—although they are in most urgent demand.

Looking ahead, remember that ships now under construction (about 2,300 over 1,000 gross tons) will not go to sea in numbers for a year or so. If you assume no drastic change in world business, these new ships may only offset the growth of trade, and the loss of ships through obsolescence.

Meanwhile, ocean freight rates are fixed by the situation now—rather than by the outlook for



. . . to a blocked Suez Canal, and you can see a long shortage of shipping ahead.

A Traffic Jam on the World's Sea Lanes

1958 or 1959. Seaborne trade is expanding at a rate of more than 75-million tons a year. Before the Middle East crisis, most scheduled ship lines raised rates by 10% to 15%. And even if the crisis had not come, they planned another increase early this year. Meanwhile, rates for the unscheduled "tramp" ships and for bulk carriers are setting peacetime records.

One uncertainty facing ocean rates is the U.S.A.'s reserve fleet of 2,000 ships, most of them old, slow-moving survivors of World War II. They could compete if rates got high enough. So far, the U. S. A. has released only a few—some to the new American company that will haul coal to Europe.

So far, there are no signs that Washington plans a wide release of dry cargo ships from the idle fleet. The fleet is, above all, a defense reserve. Beyond that, the American shipping industry has objected to the very limited release.

That does not mean that the American shipping industry is not busy. Indeed the flow of goods to and from the U. S. A. is one major reason for the shipping boom.

American consumers are buying more imported manufactured goods; American factories require ever larger amounts of raw materials from abroad. The nation now depends on imports for half its total supply of raw materials; imported iron ore, for example, now accounts for 30% of total consumption, and demand is rising fast. At the same time, the U. S. is exporting large bulk cargoes of farm products, and has become the world's chief coal supplier.

Another of the prime factors in ocean trade is rapidly-rising oil demand everywhere. Indeed, oil shipments now account for 45% of all shipments. New ship orders reflect the trend MANAGEMENT DIGEST Nov, p 14). According to *The British Motor Ship*, orders for oil carriers during the past 12 months have represented 60% of the total in world shipyards.

Present world tonnage of all ships is one-third higher than in 1938; tonnage under construction will lift the total 80% above prewar. In November, 1956, there were 50% more ships (and almost 100% greater tonnage) on order or under construction than in November 1955. Eight nations—Britain, Japan, Germany, Sweden, the Netherlands, France, Italy, and Norway—each had more than 1-million tons on the ways or planned. Even the high-cost American yards are busy—and could become much more so if the government decides to go ahead with an emergency tanker-building program.

The implications of the shipbuilding boom to businessmen are clear: Shipyards will become even fiercer competitors for available supplies of steel, other metals, machinery, and skilled workers. And shipyards will get high priority.

Not only new **ships** but new techniques and **designs are** required. A revolution in ship propulsion is in the making; the U. S. government, for one, has an $11-million program to develop new power plants for its aging cargo ships—built around the gas turbine, the "free piston" engine, new dieseis and steam turbines. The "John Sergeant," a remodeled World War II freighter, has just completed initial trials as the first merchant ship depending solely on gas turbine machinery. Apparently, shipping men are impressed by its speed and high performance.

And, by 1960, the first atomic-powered cargo ship will be launched.

Another important innovation is in cargo handling: Ships carrying dry cargo in sealed containers of standard size and shape. Such ships would be fitted with mobile cranes to lift containers from trucks or railroad cars and nest them in the hold. There would be a tremendous time-saving in port as well as reduced losses from pilfering and damage.

One major line serving Latin America plans 25 of these "container" ships. And an American coastal shipper is already using a variant of the idea: It puts 60 standard containers on the deck of a tanker equipped with special platforms. Only 10% of the tanker's oil capacity is sacrificed. ●

Digested from BUSINESS WEEK, Nov 17, p 36; BRITISH MOTOR SHIP, Nov

Crisis—and the Commodities

Shipping and fuel shortages, arms spending, world tension—all will influence commodities in 1957. Here is the situation in eight important materials as the year begins.

coffee	Surplus—more coffee beans than drinkers—seems to threaten. And soluble "instant" coffee, using fewer beans per cup, is gaining favor in U.S.A. and Europe . . . Market is dominated by Brazilian and Colombian crops. Brazil prices are strong now—current crop is 3-million bags under earlier estimates. But futures contracts seem to forecast easier prices in 1957. With a large crop, Colombian coffee faces price pressure. Bogota talks about price supports . . . African coffee is competing.
cotton	Cotton is confused. Short-staple market set by U. S. surplus sales in any currency. U. S. exports will reach 6.5-million bales in market year ending in July. Meanwhile U. S. planting controls will reduce surplus in 1957-1958. Present world crop, at 38.9-million bales, is down only 1.5%—despite larger cut in acreage. More favorable growing conditions and agricultural programs are the reason . . . Egypt's long-staple cotton mortgaged to Soviet bloc, with fierce competition for what is left.
rubber	Suez the big influence now. Europe's rubber shortage drives prices up; speculative buying has been heavy . . . Basic world supply and demand is in close balance. Meanwhile, comfortable stocks of synthetic rubber in U.S.A. could help ease shortage of natural in Europe. Also oil shortage will cut back Europe's own output of synthetic. . . . Natural rubber production will not rise much in next five years—many planters are wary of Southeast Asian investment climate.
wool	Supply and demand in rough balance: World clip rising (up 3% this year), but consumption is up too (up 9% in first half of 1956) in 11 consuming nations . . . Impact of synthetic fibers on apparel wool receding slightly; stockpiles are low, and military needs rising . . . Prices are high, and 1957 outlook good for Australia and other producers. Watch for speculation in futures market, and lower price trend. Meanwhile, note growth in German, Italian, Japanese wool fabric industries.
aluminum	Aluminum markets have eased in many nations; supplies have expanded a bit faster than demand. Secondary aluminum prices are down slightly, and could go further if the oil shortage causes slowdown in Europe . . . More aluminum ingot now available for export from North America. . . . Long term outlook is expansive as aluminum finds uses in construction, automaking, packaging. Huge new production projects – in Africa and elsewhere – promise large new supplies.
copper	Suez has marginal effect—little copper uses the canal. Supply runs ahead of demand: There's plenty of copper coming out of Latin America and Africa, and major expansion programs are underway. Meanwhile, fear of reduced industrial output in Europe tends to hold prices down . . . U. S. output in 1956 rose 10% above 1955. Now U. S. refiners have cut production to help stabilize the market . . . Long-range growth prospects are strong—1965 needs will be 40% above present levels.
tin	Tin tends to over-supply. But shipping shortage and Suez (virtually all Far East tin uses the canal) has pushed prices up. Voyage from Malaya around Africa adds about 12% to Europe's costs . . . Bolivia is big beneficiary, may add as much as $50-million to dollar earnings in 1957 . . . International Tin Agreement is in effect now—but it's questionable whether producers will keep ceiling on prices . . . Note increasing tinplate production in many nations, also new tin uses in chemicals.
steel & scrap	Steel situation is tight everywhere; higher prices are almost certain . . . Scrap prices are climbing (to a record $67 a ton in the U.S.A.); blast furnaces will be pushed to their limits turning out pigs to reduce reliance on scrap. And scrap is generally poor quality . . . World shortage of steel plate may last for years, thanks to shipbuilding boom. Structural is scare, so is seamless pipe . . . Suez and shipping shortage hits steel industry's supplies of manganese, chrome, tin, coal, and ore.

Robert Garner (right), president of the International Finance Corp., spends much time meeting people—here a group from Honduras. To all who seek industrial growth he emphasizes that . . .

Good Management Comes First

IN November, Robert L. Garner (cover picture) made his first official trip as President of the new International Finance Corporation. It took him to Santiago, Chile, to speak at the first Inter-American Management Conference, sponsored by the Pan American Council of the International Committee for Scientific Management.

The fact that Garner journeyed to Chile, and spoke about management, is significant for two reasons:

1. Latin America is perhaps the most fertile area for IFC's future operations; and,

2. Garner, and IFC, believe that the shortage of management skills is greater than the shortage of capital. At Santiago, Garner declared that the availability of management skills is the most important factor in determining the pace of industrial development.

To be sure, it is the shortage of private capital willing to embark on new ventures that prompted the organization of IFC (MANAGEMENT DIGEST, Sept., p7). Set up by the World Bank, the IFC will have a broader, more flexible task than its parent.

The idea of IFC is, briefly, to encourage private investment by joining with private partners, without government guarantees, to expand established industries, and to start new ones, in the less developed nations. IFC loans will provide for participation in profits, and will include rights to a share of ownership —which IFC hopes to sell (at a profit) to private investors after the venture becomes a success. Thus IFC will be able to rotate its capital.

With over $78-million subscribed by 33 member nations of the World Bank, IFC held its inaugural meeting in October. It has finished organizing a staff, and is receiving hundreds of inquiries from prospective investors—in Latin America, Europe, Asia, and Africa.

The corporation is moving slowly. Right now it is studying 15 to 20 especially interesting propositions. But the first IFC investment probably will not be made until March or April.

Meanwhile, businessmen can learn something of IFC's philosophy by listening to Robert Garner talk about management and economic development. He knows his subject. After a career in commercial banking and top management (he was financial vice president of U.S.A.'s giant General Foods Corp.) Garner became vice president of the World Bank soon after its organization. The team of Garner and bank president Eugene Black has helped to make the World Bank a successful and highly respected international institution.

At Santiago, Garner outlined the main characteristics of a modern industrial system—as he had observed the system in North America, and in 10 years of world travels:

- It is competitive, growing, always changing. "No business can survive by remaining as it was, or even as it is today."
- Business becomes more complex. "No longer is it sufficient to make a good product and allow the customer to buy it. It must be sold with skill and initiative."
- Management has more and more come into the hands of professionals, who replace the traditional owner-manager.
- Management's goal is to reach the largest possible number of customers. Thus it seeks constantly to reduce costs and prices, so that more people can afford to buy.
- Management accepts the responsibility of being a "good citizen" of its community, and of its nation as a whole.

"You businessmen," said Garner, "have a self-interest and a responsibility to use your influence to promote public stability and orderly administration, even at the sacrifice of some immediate personal advantages." Garner particularly urged his Santiago audience to promote a better understanding of how the private enterprise system works, and how it can produce benefits for all. That will encourage governments to create a climate favorable to profitable business at home, and attract foreign private enterprise to join in a nation's development.

Garner pointed out that management men in Latin America, and other fast-developing areas, have a great advantage in being able to draw on machines and methods that have been worked out elsewhere. But he emphasized that there were risks involved. "It may appear too easy simply to acquire the most modern machines and techniques and thus, almost overnight, to equal what it has taken others centuries to attain." Garner warned that industry develops in relation to, and not independent of or ahead of, other elements of a national society.

Garner recommends caution in assuming that a particular enterprise, technique, or machine that works in one nation will be best for another. "For example, in North America it may be economic to buy

the most modern and expensive machine because it reduces high priced labor by 20%. But for you such a machine might not pay out the heavy investment because your labor costs less."

Nonetheless, Garner is convinced that there are basic principles that management everywhere can follow. Garner believes:

- That "management" embraces all elements of a business. It is more than technical skills, or "know-how," on the production line; it is "know-what"—in the sense of charting a business' long-term future—as well.
- That larger enterprises need professional managers. This new type of businessman requires training such as one finds in other professions — law, engineering, medicine. Schools of business, management consultants, training courses of all kinds are essential.
- That the world's growing experience in management training is becoming available to industry everywhere. Young men can attend business schools in other nations; universities can import trained experts; industries can cooperate to organize training courses, and seek help of foreign companies who have shown that they have both the "know-how" and "know-what" of good management.

This preoccupation with management will show up in all IFC operations. Garner puts it this way: "The character and competence of our partners will be the first essential."

It follows that IFC is being extremely cautious and conservative as it prepares to make its first investment. Washington observers point out that, since building confidence is so important in launching an investment company, and since the World Bank's own reputation is at stake, IFC will try to pick several sure successes at the start. That may well mean joining with an already well-established international company in an expansion program, rather than entering a completely new venture (IFC has been talking extensively with several American companies operating in Latin America).

"This is not a philanthropic venture," Garner told McGraw-Hill recently. "It is an experiment in building up both the flow of private funds and new businesses. To do that, we have got to show that the basic idea is sound and profitable."

So no risky deals in the beginning. IFC will concentrate only on industrial ventures—such as food processing, metal fabrication, mining and mineral operations, and so on. Later, when reserves build up, it will consider entering other fields—such as agriculture, retailing. IFC realizes it cannot do the job it is designed to do by permanently adhering to strict World Bank standards of credit-worthiness. The time will come for gambles. ●

Conrad Hilton

Byron Calhoun

Yankee Hotelmen Expand

When the Continentale Hilton opened in Mexico City last month, another small red flag went into a world map in New York's Waldorf Astoria Hotel, headquarters for hotel magnate Conrad Hilton's international operations (left). Three other red flags were already there—pin pointing hotels in San Juan, Puerto Rico, in Madrid, and Istanbul—and more were waiting for hotels to be completed in Acapulco, Berlin, Havana, Tokyo, Rome, Montreal, Cairo, Baghdad, and Bangkok.

Hilton's brand of business diplomacy has enabled his Hilton Hotels International, Inc., to enter into partnership with governments, semigovernmental organizations, and private groups. The usual agreement calls for Hilton to operate a locally-owned, Hilton-designed hotel on a 20-year lease. In return, Hilton gets about a third of the operating profit.

So far, Hilton partners range from the Turkish government pension fund, the Canadian National Railways, and the Puerto Rican, Berlin, and Trinidad governments to former president Aleman of Mexico, a Cuban labor union, and a member of Thailand's royalty.

International hotel chains such as Hilton's are counting heavily on the tremendous increase in air travel expected in the next few years. Indeed, it is an airline that boasts the largest U. S.-owned hotel chain in foreign countries.

Since 1949, Intercontinental Hotels Corp., a 10-year-old subsidiary of Pan American World Airways, has bought or built eight hotels in Latin America. Five more are under construction in San Juan, San Salvador, Curacao, Guatemala City, and in Beirut, the first outside the Western Hemisphere. Plans are underway for many more.

After eight years of losing money, IHC finally came through with a profit in 1954; and profits for last year are expected to be over $500,000.

IHC has very little investment in the hotels it operates—the main financial role has been to help local owners get loans (the U. S. Export-Import Bank is one source). IHC either leases a hotel, and pays the owners a percentage of earnings, or receives a fee under a management contract.

Byron E. Calhoun (above right) IHC's globe-trotting president and chief negotiator, has definite opinions about new hotels built for air travel. They should be fairly close to the airport, have about 400 rooms and space for conventions.

Though IHC, like Hilton, will make a big play for the tourist trade, it privately admits that businessmen will provide most of its year-round revenue. ●

Digested from Sales Management, Oct 19, p31; Business Week, Nov 10, p105.

Building a Future for Forest Products

1. Paper Looks to New Raw Materials

Despite a steady postwar expansion in newsprint and paper production, shortages still persist—and on a worldwide scale. Because of this, paper manufacturers and businessmen everywhere are looking for new raw materials and still better ways to make paper.

Paper's traditional raw material has been softwoods—spruce and pine, for example. But now hardwoods, too, are being seriously considered. And such non-wooden materials as bagasse, abaca and other fibers may be important to paper in the future.

A recent development emphasizes this trend. W. R. Grace & Co. (New York, N. Y.) plans to spend $46-million in the next 3 years in expanding its Latin American paper production. Grace expects to build its expansion program around bagasse (sugar cane waste) as the basic raw material. This isn't new for Grace; it has been making paper from bagasse since 1939 at its Paramonga, Peru, sugar plantation.

Plants will be built in Puerto Rico, Colombia, Cuba, Mexico and Brazil. The Brazilian plant is the only exception to Grace's intent to use bagasse as its raw material; instead, it will depend on the eucalyptus tree.

New Hope for Hardwoods

While bagasse figures largely in Grace's plans, other segments of the paper industry have high hopes for hardwoods. The conventional softwoods are in short supply everywhere: Hence the industry's intense interest in any process that can convert into paper the vast stands of mixed hardwoods that cover tropical and semi-tropical areas of the world.

Three hardwood-based plants, soon to start production, will be carefully watched by paper manufacturers.

- Associated Pulp & Paper Mill Ltd., with a 17 tons-per-day plant in Tasmania to supply pulp for specialty papers. Raw material: eucalyptus.
- Australia Newsprint Mills Ltd., with a mill in Boyer, Australia, producing 28 tons-per-day of pulp for newsprint. Again, eucalyptus.
- Cartiera Vita Mayer & Co., with a 55-tons-per-day mill in Lonata, Italy, for tissue paper. This one to use poplar.

In all these mills, ground hard wood chips will replace part, but not all, of the softwood-derived groundwood pulp in the finished paper. But a eucalyptus-based mill to be built in Brazil by the newspaper *O Estado de Sao Paulo* will produce groundwood from chips to supply all the normal proportion of groundwood used in newsprint.

Up to now hardwood pulping processes included a chemical pretreatment of the hardwood feed with cold caustic soda or hot sulfite. But from the U.S.A. may come a process that reduces or even eliminates this step. Bauer Bros. and Sprout-Waldron, U. S. papermill equipment makers, are studying this possibility.

Details are still obscure. But experts say more experience with commercial installations is needed because of variations in the finished product which are still not entirely predictable. However, there are signs that the process definitely has potential:

- Yields are on a par with conventional groundwood processes.
- Strengths of pulps, both softwoods processed mechanically and marginal woods (including hardwoods) processed chemi-mechanically (combined chemical and mechanical processing), range from about that of conventional groundwood to 50% greater.
- Costs are equal to or lower than those for conventional groundwood processing. Power requirements are about the same, and capital costs are substantially lower. Labor requirements are also low.
- Space requirements are low. A 100-ton per day mill would need 315 square meters of floor space.
- The process is flexible. A mill designed to produce chemi-mechanical pulp from hardwood can, without change, be used for softwood mechanical pulp or for fully cooked fiber. The only difference between the wide varieties of pulps possible are the degrees of application of cooking chemicals, digestion steam, and mechanical energy for refining.

Press Makes the Difference

While Bauer and Sprout-Waldron study new pulp-making processes, Gould Paper Co. (Lyons Falls, N. Y.) has just launched the first American plant to produce groundwood pulp from hardwood chips. It is typical of the chemi-mechanical method of making groundwood from chips with this difference: The conventional paper mill equipment (refiners and cleaners) is preceded by a rapid-cycle digester for cold caustic pretreatment and a heavy screw press that reduces chips to small slivers. An alternative chemical pretreatment would consist of soaking the chips in hot sodium sulfite. A rapid-cycle digester would be used.

The screw press is the one unit in the groundwood-from-chips process that is new to the paper industry. Its design is similar to that of presses used in the vegetable oil industry to expel oil from cottonseed, soybeans and the like. Both Sprout-Waldron and Bauer Bros. are marketing presses to the paper industry.

In the past, pulp mills have used presses that can accept pulp to squeeze out liquor as an aid to chemical recovery or disposal. But the new press is the first which can accept chips. This ability may make a place for it, not only in groundwood-from-chips processes.

Digested from CHEMICAL ENGINEERING, Nov, pp134, 282; PAPER INDUSTRY, Oct, p644

but in any of the partial-cook pulping processes (where wood chips are not completely pulped). Chemicals can be squeezed out while they are still relatively concentrated because the chips have not yet been diluted for treatment in the refiners. Thus, the new presses could lead to cheaper chemical recovery. ●

2. Wood Chemicals Search for Markets

Even though pulp and paper manufacturers are primarily concerned with new raw material sources, they, along with the rest of the forest products industry, are beginning to take a serious interest in byproduct chemicals (or silvichemicals). Just recently, for the first time on a commercial scale in North America, conventional forest products became the byproducts of a chemical operation.

Pacific Lumber Co.'s (Scotia, Calif.) redwood bark plant and Rayonier Inc.'s (Vancouver, British Columbia) hemlock bark plant both extract chemical values from virgin bark. Only then do they turn over the fibrous residue for processing into board, insulation, other conventional forest products.

Economic reasons for more complete chemical utilization of the tree are many: high cost of stream pollution; higher costs of timber processing and pulping; increases in cost of chemicals from other natural sources. All these factors will help to change the forest products industry from a predominantly chemical consumer to both a producer and a consumer. And such factors may well bring new products and processes that can, in turn, create volume markets for silvichemicals.

Still, the forest products industry faces a huge problem. Paper mills produce millions of tons each year of spent liquors from wood pulping. Add to this the huge tonnage of waste wood accumulated by lumber mills. Only a negligible amount is turned into chemicals. Volume markets are needed before the industry's waste mountain can be profitably utilized. Here are examples of how several American companies are operating under these conditions:

• Crown Zellerbach Corp. has a 1-million-kilogram-per-year plant to produce dimethyl sulfide from kraft waste liquor. But the entire U. S. kraft industry alone could easily turn out 350-million kilograms of dimethyl sulfide a year.

• Rayonier has a promising product in its myricetin from bark. But even if myricetin were widely adopted for use in cold remedies, its market would be tiny.

• Weyerhaeuser Forest Products Co. is currently selling about 10,000 tons per year of Silvicon, its physically fractionated Douglas fir bark. It could produce 60,000 tons per year at its Longview, Wash., mill alone.

• Marathon Corp. has recovered vanillin from sulfite waste liquor for more than 20 years. But the market for vanillin as a food flavorant is nearly nothing in the eyes of the pulp industry. All demand could be met by one plant operating part time. Now another important derivative of vanillin has been reported, though again the market is likely to be small. The University of Vienna says vanillic acid diethylamide has a marked therapeutic effect on respiration and blood pressure.

The Japanese also have plans for silvichemicals. They expect to extract glucose, molasses, and acetic acid from waste lumber. Ready markets exist if process problems can be overcome.

In general, the forest products industry has neither the inclination nor the experience to build volume markets for specialty items. One approach to the market problem has been suggested by a Weyerhaeuser executive: "The forest products industry will probably have to form a silvichemical complex. Much as the chemical industry is its own best customer, the forest products industry will have to become its own best silvichemical customer. Where it may not pay to extract myricetin alone, it might pay to extract a whole fraction of chemicals; myricetin, quercitin, dihydroquercitin, waxes and other organic extractives. One company might develop a process —and a market—for one fraction, another for another fraction." ●

3. Packaging Comeback for Wood

The nailed wooden box, and the collapsible wooden crate, are about to stage a comeback. This was one of the findings at a recent meeting of the Society of Industrial Packaging & Materials Handling Engineers (U.S.A.). Engineers said the strong trend toward "unitized" shipping (a number of smaller loads shipped as a single unit) is responsible.

The Association of American Railroads finds that shipping track maintenance material in individual boxes (weighing up to 90 kilograms each, and made up into a unit) has cut its unloading time per car from 8 hours with two men and a fork truck to 40 minutes. Skids strapped to the unit eliminate the expense of palleting.

American Can Co. and Schaefer Brewing Co. have worked out a unitized plywood box container that can deliver 9,000 beer cans per load to the brewery's filling machines in predetermined multiples. American Can chose the wooden box because it provided greater protection against denting of cans. Dented cans jam the filling machinery and raise the brewery's packaging costs.

Collapsible wooden crates that can be knocked down and set up again for repeated use are being fitted into a number of manufacturing operations. They become an integral part of storage and transportation planning.

In the potato-growing state of Maine, collapsible wooden boxes are winning back markets lost to bags. When the consignee empties the shipments into sorting bins, the crates are returned flat to the shipper. The collapsed boxes make as many as 25 round trips to market and take a relatively low freight rate on the return trip.

The Greenlee Tool Co. has a variation of the multiple-use container. It ships its pipe-bending kits in special boxes that can be used by the plumber, electrician, or factory maintenance man as a carrying case to get the tools from job to job. ●

Water Shortages...

. . . around the world are being met by efficient new sea-water conversion plants.

Digested from CHEMICAL ENGINEERING, Oct, p126

Modern multiple-effect evaporation plants are turning the seas bordering thirsty areas into what amounts to reservoirs of drinking water. Two huge new installations are underway—one for the Caribbean island of Aruba, the other for the Sheikdom of Kuwait, on the Persian Gulf. And in the U.S.A., Pacific Gas & Electric's Morro Bay (Calif.) power station is getting its boiler makeup water from the Pacific Ocean via triple-effect evaporation.

Multiple-effect evaporation, at its best, is a costly substitute for the processes of nature. But new engineering improvements have brought submerged-coil and flash-evaporators to new peaks of efficiency. For example:

- Kuwait's 5,000-cubic-meter-per-day flash evaporation system is to be built in two 2,500-cubic-meter-per-day steps. Each consists of two towers of four vertically stacked evaporators. Westinghouse Electric International Co., manufacturers of the equipment, say this installation will cut the cost of making water by about 30%, to something like $0.70 per cubic meter.
- Aruba needs both fresh water and electricity. A G. & J. Weir Ltd. (Glasgow, Scotland) evaporation plant will supply both needs. It will produce 1000 cubic meters per day of fresh water, and also generate up to 12,500 kilowatts of electricity. The plant is expected to halve the present cost of fresh water. As of now, Aruba's fresh water depends on a small evaporator and tankships.
- Pacific Gas & Electric found a nearly ideal site for its 300,000-kilowatt steam-to-electric power station. It had everything but fresh water. So PG&E decided to make its own water. It uses two triple-effect evaporator trains to provide 575 cubic meters per day of fresh water. The cost: $0.65 per cubic meter. ●

For High-Production Machines use....

Ex-Cell-O Quill-Type Hydraulic Power Units

This special machine with automatic indexing fixture core-drills piston pin holes and drills angular oil holes. It uses six Ex-Cell-O Power Units (shown without belt guards) operated from a central push-button station.

Ex-Cell-O Power Units feed and rotate tools in easily controlled automatic cycles. A single tool can be held in the unit spindle or a multiple head can be bolted to the quill flange. The Units are used in low-cost, high-production machines for such operations as drilling, reaming, counterboring and spot-facing. A typical machine consists essentially of a plain base, a work-holding fixture and one or more power units.

Ex-Cell-O Units are self-contained and compact; can be mounted horizontally, vertically with the spindle nose down, or at any angle between these positions. For details about these units write, or cable Ex-Cell-O in Detroit.

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55-25

Plastics Open Way to New Appliance Designs

Digested from MODERN PLASTICS, Nov, p114

For the first time, the household refrigerator industry can improve its production design and styling annually. Up until now, manufacturers have been tied to a basic style over long periods because of high tooling investments. The all-plastic refrigerator (above), developed by Westinghouse Electric Corp. (U. S. A.) makes it possible to build a few hundred or a few thousand of one model, different in design, but priced competitively with traditional refrigerators. According to Westinghouse, "This is the first major step toward achieving 'dynamic obsolescence' in the household refrigerator field."

Its implications are by no means limited to the refrigerator industry. If the all-plastics refrigerator succeeds, it may well bring a new era to appliance design and construction. The process has already aroused the curiosity of other industries, particularly food processing plants, bakeries, makes of trucks and railway cars, and building. All are interested in the possibilities of strong, lightweight, and easy-to-fabricate plastic construction.

The new design is based on a simple plastic "sandwich" construction. The outside skin of the sandwich is a sheet of polyester resin-fibrous glass laminate; the inside skin is a sheet of high-impact styrene alloy; and the core is a 7.6-centimeter-thick layer of styrene foam insulation.

By taking advantage of the physical characteristics of this sandwich construction, Westinghouse engineers have come up with a basic refrigerator body that has these features:

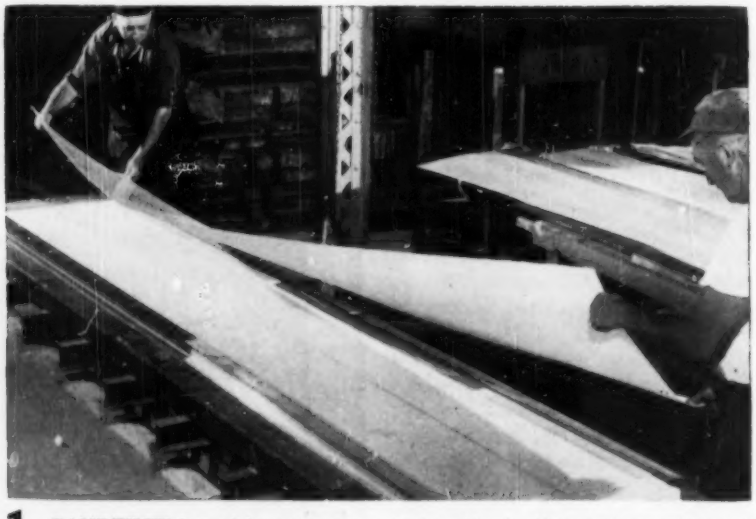
- Lightweight. A similar body in steel would weigh three times as much.
- Excellent insulation characteristics.
- Flexibility in styling.
- Quick fabrication in almost any shape or style with a minimum tooling investment.

Because each refrigerator cabinet is formed from a single flat sheet of the sandwich material, fabrication consists basically of simply mitering out the corners, folding the sandwich panel together like a cardboard carton, and bonding the corners together with an epoxy resin adhesive.

The two pilot plastic models introduced by Westinghouse were designed to be built directly into

Here is how the process works

Take a plastics sandwich, apply some simple, low-cost tooling and you have a new kind of refrigerator design.



1. SANDWICH for refrigerator construction is laid up prior to lamination in a hydraulic press. Exterior skin is fibrous-glass reinforced polyester; interior skin is high-impact styrene alloy; core is foamed styrene.

the kitchen wall. Both models have a 368-liter capacity. One model, designed to be used vertically, has a refrigerator compartment at the top and the freezer compartment underneath. The horizontal model (picture, page 20) has the two compartments side by side and may be installed on base cabinets of any height or attached to the wall.

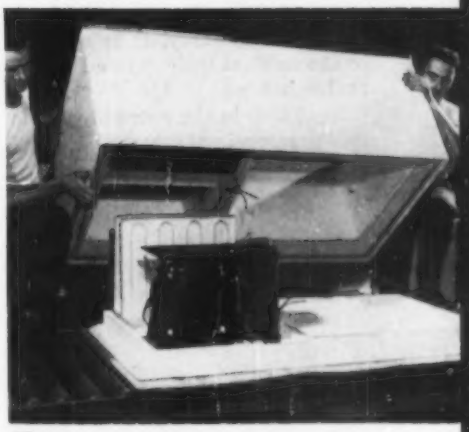
The only major components of the refrigerator shell not made of plastics are the steel doors. But Westinghouse expects to have models with doors based on sandwich construction available within a year. One problem: how to cover the edges of the sandwich panel (where the core material shows through) so that the door has a finished appearance.

Manufacture of the sandwich itself consists of cementing together (1) reinforced plastic outside skin (0.80 millimeters thick), (2) glossy high-impact styrene inside skin, (3) 0.035-kilogram-per-liter density foamed styrene core. A hydraulic press provides the necessary pressure.

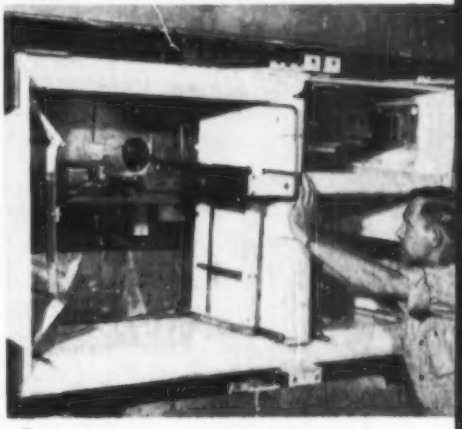
The sandwich material is cut into a plank about 4.2 meters long and 0.55 meters wide, which eventually forms the top, sides, and bottom of the refrigerator body. This is done by notching the "V-joints" for the corners through the inner skin and core of the sandwich (just down to the outer skin) in such a manner that the plank can be folded around previously assembled interior partitions. These partitions are also fabricated of plastic sandwich materials, and are grooved so that they can be mounted together and into the main body.

The mitered joints which form the corners of the structure, as well as the butted ends of the plank, are bonded together with an epoxy resin adhesive cured by radio frequency energy. This operation consists of placing the assembled basic cabinet in a positioning jig and—with special radio frequency equipment—passing 39,000 volts through electrodes in the corners for about 7 seconds. The interior partitions are bonded in place in the same manner as the corners of the basic cabinet.

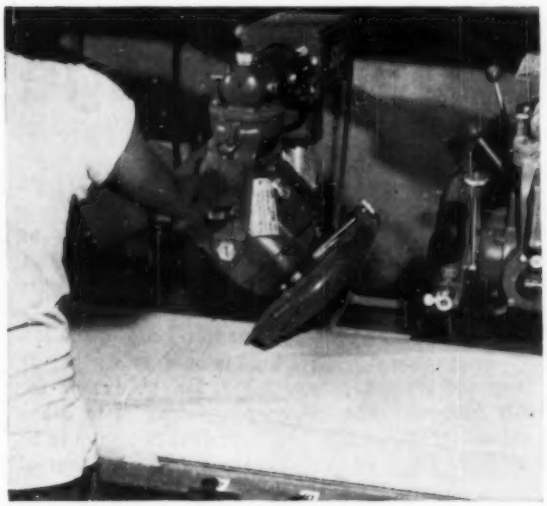
The final member of the refrigerator body is the rear wall. It is also fabricated of sandwich materials. Prior to assembly, the wall is edge cut and drilled to nest compactly with the basic cabinet body (which also has been edge cut to accept the rear wall). In addition, openings to accommodate the condensing system (compressor, compressor fan condensers, and refrigerating plates) are routed out of the rear-wall sandwich panel and the entire system is mounted on the wall before installation. Be-



5. ASSEMBLY BODY is removed from jig and screwed to the panel which supports the mechanism.



4. JOINTS are treated with epoxy adhesive. Jig holds refrigerator body while adhesive is cured.



2. "V-JOINTS" for corners of cabinet are cut through inner skin and core of the sandwich just down to the outer skin. A standard radial arm saw is used.

3. PLANK is next folded at V-joints (like a cardboard carton) around previously assembled interior partitions which are also made of sandwich materials.

cause of the weight that the back panel has to carry, it is screwed to the cabinet body instead of adhesive bonded.

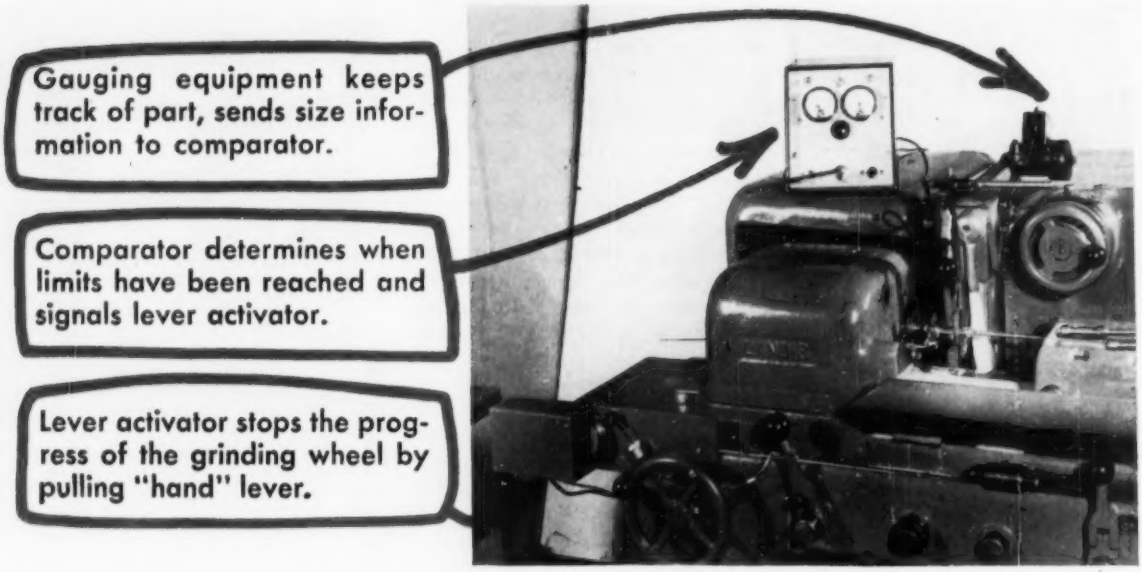
Next step in the assembly of the refrigerator is the installation of hinges for the steel doors. To support the doors, wooden braces are set into the foamed styrene insulation at the edges where the hinges are located. The breaker frame which covers the front edge of the structure is vacuum formed of high-impact styrene sheet. The frame is held in place by a stainless steel trim that embraces the outer front edge of the body; inner edges of the frame are held in place by an extruded styrene section that is mounted to the refrigerator body with screws. The screws bite into plywood inserts.

Many advantages are derived from sandwich construction. The ease with which the material can be worked makes it especially adaptable to custom, built-in, refrigerators.

Weight of the new refrigerators is considerably less. Even with steel doors, the units average 75 kilograms less weight than steel models with the same cubic capacity.

The strength of the new units is also an outstanding feature. Because of the structural advantages of sandwich construction, Westinghouse engineers believe that ultimately refrigerator walls made with this material can be thinner than is now possible. This will lead to more compact units and more efficient use of space.

Finally, because rigid foamed styrene insulation is moisture resistant, and never settles, it will retain its original insulating efficiency indefinitely. On the other hand, the efficiency of insulation in standard refrigerators (generally, fibrous glass materials) may decline as the material absorbs moisture and settles. ●


Gauging equipment keeps track of part, sends size information to comparator.
Comparator determines when limits have been reached and signals lever activator.
Lever activator stops the progress of the grinding wheel by pulling "hand" lever.

Tool Controls – by the Package

Digested from BUSINESS WEEK, Nov 3, p83

The prospect of completely automatic factories often obscures the fact that simple machine tools such as grinders, lathes, and planers can sometimes be "automated" at a small part of the cost of new tools.

Airborne Instruments Laboratory Inc. (Mineola, N. Y., U. S. A.) has developed a new line of electronic gaging and control equipment designed for standard machines. The company's devices can be joined together to do a variety of jobs on different metalworking machines.

The picture above shows what they can do. The established rate of production of the standard grinding machine was 90 parts an hour with an experienced operator. Manual gaging by the operator caused a number of rejects. With the new three-unit control system, Airborne says that output has been increased to over 200 parts per hour and the number of rejects greatly reduced.

In addition these units, called MICROtrol, can do other jobs. For example:

• **Sorting parts** according to acceptability—undersize or oversize.

• **Keeping track of part size** for statistical quality control surveys.

• **After-gaging control** of machining operations—by sending the information obtained by measuring a finished part back to the machine as a correction.

For the smaller shop, each MICROtrol unit is sold as a separate package, self-sufficient except for the cables connecting it to other units. The user does not have to be an expert in automatic control theory. All he has to do is break the job down into its mechanical steps, and then connect a unit for each step. ●

EUCLIDS
sure do the job!

A British built Rear-Dump Euclid hauling 15 tons of quarry stone for road construction in South Africa.

▶ Wherever large tonnages of earth, rock, coal and other bulk material must be moved in construction or mining operations, you'll probably find Euclids doing the job.

In the heavy construction field, as an example, Euclid equipment helps contractors complete their work on schedule. Large capacity, speed and tremendous power enable "Eucs" to move big loads under the most difficult conditions. Built exclusively for heavy off-highway service, they stay on the job longer with minimum time out for repairs.

Men who built roads, airfields, dams, etc., and those who are engaged in open cast mining, prefer Euclid equipment because of its dependable performance. They know, too, that a world-wide dealer organisation assures parts and service facilities that will keep their Euclids in first rate operating condition.

Rear-Dump Euclids have payload capacities of 10 to 34 tons . . . 20,000 to 68,000 lbs. They are powered by diesel engines of 125 to 400 h.p. . . . have 5 or 10 speed gearbox or torque converter drive . . . top speed of 36 m.p.h. depending upon model and tyre size.

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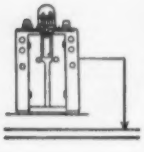
PROCESS FLOW CONTROL

The W&T Merchen Scale Feeder, shown above at a large processing plant, is used to continuously weigh and feed dry free-flowing materials in the preparation of formulated compounds. Wallace & Tiernan equipment was chosen because of its dependability, adaptability, and high order of accuracy. These qualities are typical of the W&T line which includes chemical solution feeders, gravimetric and volumetric feeders, and gravimetric meters — all with definite application in process industries.



CHLORINATION

Equipment includes chlorinators of both the water and mechanical diaphragm types in all capacities, hypochlorinators, and many other auxiliary and accessory items designed for use in the treatment of water for sanitation as well as for numerous industrial purposes.

PRESSURE SENSITIVE INSTRUMENTS

Equipment includes a complete line of aneroid and mercurial pressure sensitive instruments, such as altimeters, barometers, and manometers designed for use in industrial testing as well as for research purposes.

AIDS TO NAVIGATION

Includes a number of protective devices for navigation such as buoys, lamp changers, flasher mechanisms, signal timers, fog horns, aircraft flasher units and other related apparatus designed for use in the marine and air transportation field.

Other quality Wallace & Tiernan products and services used throughout the world are listed below. For further information send for list number F-103 of available free technical publications on all Wallace & Tiernan products.

Ammonia Control Apparatus — Cathodic Protection Systems — Chemical Feeders — Chlorinators — Decay Control Process for Produce — Electric Marine Beacons — Flour Processing Chemicals — Pharmaceuticals — Precision Instruments

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F-103

Czech Tools . . .

. . . bid for a larger share of the world machine-tool market with unique designs.

Digested from AMERICAN MACHINIST, Nov 5, p178

Czechoslovakia gave the world a good glimpse of its machine-tool technology at the annual Brno Engineering exhibition. Among the new Czech machines shown:

• **A gear-roller** that can hot-forge spur and bevel gears in one-tenth the time needed for a conventional hobber. Blank is first heated by high-frequency induction. After 8 seconds of rolling, the two sides of the gear's teeth are machined. Machine is considered experimental. But final version is expected to produce gears that will need only a finish shaving or grinding.

• **A copying lathe** with punchcard programming of speeds and feeds has an upper and lower tool slide that can be staggered along the workpiece, either for rough cutting or simultaneous rough and finish turning. A master and hydraulic tracer on top of the machine controls the form, while separate punchcard systems for the two slides determine speeds and feeds.

• **An electro-hydraulic copy shaper** completely machines complex forms. Templet and work are turned manually four times through 90° to cover the entire surface.

Another copying attachment was shown on a standard vertical milling machine. Master and work are carried end to end on a longitudinally rotating fixture mounted on the table. The fixture turns slightly at the end of each table traverse, while the hydraulic tracer mechanism controls the vertical position of the table.

• **A gear-shaving attachment** fitted to an ordinary milling machine, intended for small shops, has a scraping wheel driven from the main spindle through a 360° rotatable head. The gear turns on a simple fixture clamped to the table.

• **Ceramic cutting tools** were much in evidence. They were demonstrated both on large cast iron pistons and on steel. ●

Looking Ahead in Technology

WAX-FROM-RICE recovery method may prove an extra source of income for rice-producing nations. Developed by the U. S. Department of Agriculture, it is the first practical system for extracting both oil and wax in one continuous operation. A single solvent, hexane, is used. Previous methods required other solvents in addition to an expensive and complex extractive process. Wax obtained can replace carnauba and other hard waxes used in polishes, carbon paper, shoe stains, and other products. (*American Letter, Oct* 13)

●

SUNNY SUBSTITUTE for natural fertilizer is under development in Japan. The National Nagoya Industrial Technology Research Institute is attempting to produce chemical fertilizer (ammonia) in a solar furnace. Sun's rays, focused on a glass reactor vessel, will cause nitrogen and hydrogen to react. (*McGraw-Hill World News*)

●

FREE-PISTON ENGINE will get a tryout in a chemical process plant in England. Imperial Chemical Industries will put in fifteen 1,000-horsepower free-piston engines developed by the Free Piston Engine Co. Engines will drive several large rotary compressors in the new plant of ICI's Billingham Division. (*Chemical Week, Nov* 3, *p*113)

●

SPRAYING STEEL on aluminum cylinder walls opens new horizons to the use of aluminum in lightweight internal combustion engines. Joint testing by Aluminum Co. of America and Metallizing Engineering Co., (both of the U.S.A.), covering several-hundred running hours, showed aluminum pistons and steel-sprayed aluminum cylinders to be superior to conventional units. Problem of steel-to-aluminum bond was solved with Metallizing Engineering's Spraybond process. A thin layer of molybdenum between the aluminum and steel serves as a bonding agent. (*E&MJ Metal & Mineral Markets, Oct* 18, *p*7)

●

A NEW PAPER has been developed by the Institute of Cellulose Chemistry, Darmstadt, Germany. It can be printed without printing inks. The paper has a casing containing two layers of chemicals, separated by a gelatin film. Pressure of the type in the printing press, or typewriter, ruptures the film—permitting the two layers of chemicals to react and produce a visible color. When the paper is used in a typewriter, the typewriter ribbon or carbon paper can be eliminated. (*Paper Industry, Oct*, *p*644)

TECHNICAL SERVICE for Imperial Chemical Industries' customers, both in England and abroad, is being centralized in a new building near London. Seven specialized laboratories will cope with problems in molding, compounding, extrusion, rubberlike polymer technology, monofilaments and films, rigid plastic fabrication. (*Chemical Week, Oct* 20, *p*52)

●

BORON 10 is being produced by Twentieth Century Electronics, Ltd. (Surrey, England) by a process claimed to use the world's first commercial isotope separation column. The column is a narrow tube packed with 8 kilometers of stainless steel wire. (*Business Week, Nov* 10, *p*142)

●

A FERTILIZER plant using the new phosphoric-from-rock process developed by Manufacture des Glaces et Produits Chimiques de Saint-Gobain (Chauny et Cirey, France) is being built in Alberta, Canada, for Northwest Nitro Chemicals Ltd. It will produce ammonium sulfate phosphate for use as fertilizer. The St. Gobain process is far more simple than other processes from an equipment and operation standpoint. Key: a single-stage ore digester for phosphoric acid production. Other processes require as many as 11 reactors for the acidulation of phosphate rock. (*Chemical Week, Nov* 10, *p*52)

●

CHEAPER MAGNESIUM should result from a process demonstrated by Magnesium Elektron at Clifton Junction, England. The conventional electrolytic method is uneconomical because of high cost of electricity and materials. The new process reduces calcined dolomite and ferro-silicon briquettes at a high temperature in a vacuum. Magnesium metal is liberated as a vapor and condensed in the form of metal crystals on the cool end of the vacuum chamber. Low-grade oil fuels the process and England has ample reserves of dolomite. Ferro-silicon comes from Norway, but the cost is low. Thus the company feels that its magnesium will be competitive in cost. (*Product Engineering, Nov*, *p*213)

●

TWO-STEP METHOD for rot- and moth-proofing cotton and wool has been developed in Australia. First the fiber is oxidized by a combination of oxalic acid and potassium bichromate. Then the fiber is treated with compounds in the hydrazine group. Those tried so far: phenylhydrazine, M-nitrophenylhydrazine and 4-4 dihydrazinodiphenyl on cotton; p-nitrophenylhydrazine on wool. (*Textile World, Nov*, *p*139)

BIGGEST NEWS YET FROM **THE *FORWARD* LOOK**

THE NEW SHAPE OF MOTION *FLIGHT-SWEEP '57*

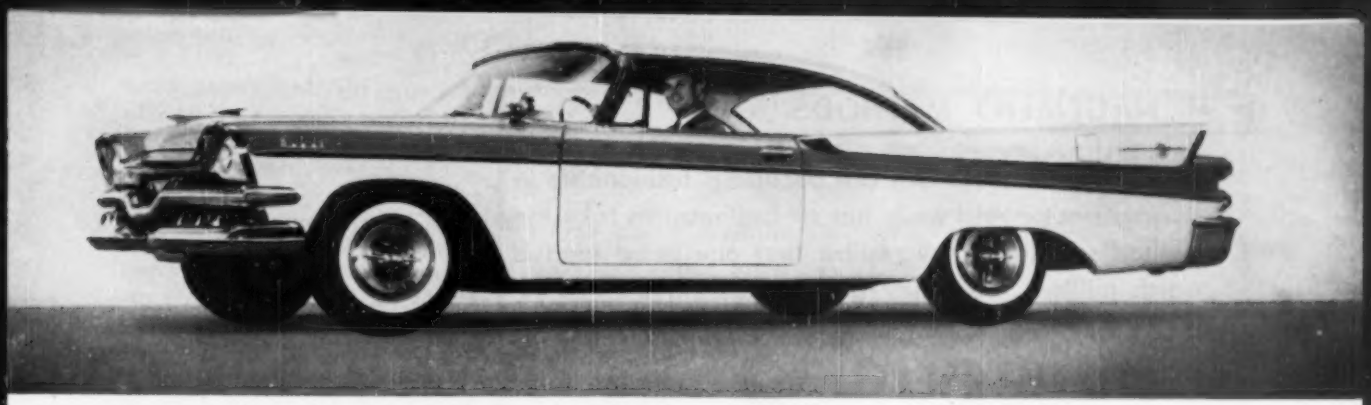
1957 PLYMOUTH *Finest car in its field! Dramatic lowness, yet more comfort and more room!*

THE NEWEST NEW CARS IN 20 YEARS!

For 1957, Chrysler Corporation presents *five complete lines* of cars . . . 93 models . . . with *total newness!*

You will enjoy styling so striking, so right for our times that it's called THE NEW SHAPE OF MOTION. You will ride as on a carpet thanks to the year's outstanding engineering advance: *Torsion-Aire!* You will have revolutionary new *Total-Contact Brakes* . . . and Pushbutton *TorqueFlite*, newest and smoothest of all automatic transmissions.

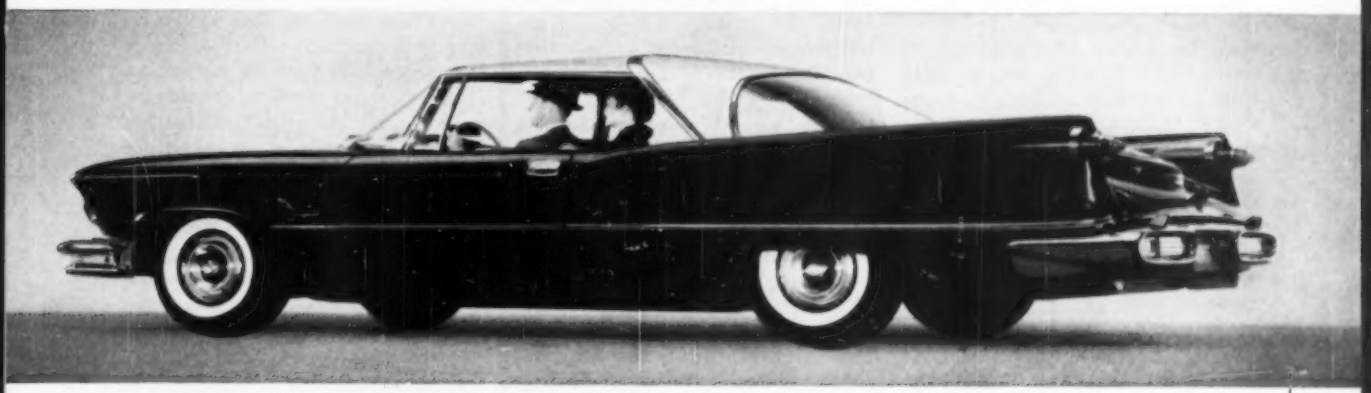
These are just highlights. See your dealer! Discover the extra value you get in a 1957 car from The *Forward* Look!



1957 DODGE *New features like Total-Contact Brakes, Pushbutton TorqueFlite make it a value standout!*

1957 DE SOTO *Like all Chrysler Corporation cars, it has "floating comfort" of new Torsion-Aire Ride!*

1957 CHRYSLER *Styling puts it first in its field—performance keeps it there!*



1957 IMPERIAL *Finest expression of The Forward Look, now in a wider range of models!*

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Group creativity sessions are becoming fashionable in management. And while not all businessmen take the method seriously, they realize that one good idea is worth millions. So they are considering . . .

"Brainstorming" to New Ideas

Digested from HARVARD BUSINESS REVIEW, Nov-Dec., p41, INDUSTRIAL DISTRIBUTION, Sept, p105

Where do new ideas come from? From people, of course. But how can you get people to think of new ideas?

This is a problem that every manager faces. Companies all over the world have tried to encourage creative thinking with suggestion systems, bonus plans, prizes, other rewards. All of these methods, however, fall back on the imagination of one man.

Several years ago, an American advertising executive developed a procedure to "create" ideas. He called it "applied imagination." The method is now generally known as "brainstorming;" many business enterprises use it in one form or another.

Instead of depending on one man's imagination, the method sets up a mental "chain reaction" in a group of people. Basically, a brainstorming session is a conference in which all evaluation and criticism are suspended.

Any idea on the problem is welcomed—no matter how fanciful or unrealistic. The purpose is simply to list as many ideas as possible. One idea leads to another, then another and another. By the end of the session, a large number of ideas have been suggested—many times more than the people could think of working separately. Since "wild" ideas are included, only a small percentage of the total can be seriously considered. But experience has proved some extremely good ideas result.

Later, a management group meets to evaluate the ideas. In the brainstorming group, the members are usually taken from the same level in the company. But there is no upper or lower limit. Janitors and machine operators, as well as plant managers and vice presidents, have untapped resources of creative imagination.

Management has used brainstorming to attack a wide range of problems—production bottlenecks, communications systems, marketing methods, even new products.

The idea of brainstorming has been carried to its highest level by W. J. J. Gordon, a research consultant of Cambridge, Massachusetts. Gordon's company maintains a permanent group of seven men who use the technique to invent new products for clients. Gordon has gone so far as to develop a "theory of operational creativity."

Although most companies find the lesser goals of brainstorming more suitable to their needs, anyone considering trying it should find Gordon's experience useful.

Gordon says that creativity goes through the same phases in a group as in an individual—an inventor, for instance. In brief, these phases are:

1. There is a continuous shifting back and forth between being involved in the problem and being detached from it.

2. Speculation and imagination run free. But, since the usual reaction to speculation is "guilty until proved innocent," evaluation must be deferred.

3. The problem takes on a "life" of its own; it takes a hand in fashioning itself. The creative process itself is purposeful; hence the creative people in history often have set the stage for a discovery that seems "accidental."

4. New ideas must come from somewhere. Obvious and mediocre ideas are important ingredients of creativity. They are at first accepted, then recognized, and finally discarded when a new idea is developed.

A creative group acts like an individual, only surer and quicker. When the members become preoccupied with details, somebody in the group turns the discussion to a larger idea. When an idea becomes too abstract, some member will bring the group back to reality.

Gradually, the group gets nearer to its goal. Every time it seems to veer away, it comes back closer than ever. Some discussions seem to be going down blind alleys; sudden turns seems like accidents or aimless wanderings. In the case of group invention, how the product that develops is not sharply defined, but a distinct pattern is unmistakable.

A group has a big advantage over the individual in finding a "springboard" — a commonplace idea from which the group can leap. However, a starting place is much harder to find if "experts" in the group try to solve the problem in terms of their own particular technology.

If he carries full responsibility, the leader of the group must have an almost pathological optimism in refusing to give up. The technique is too different from everyday "work" for hard-working people to take to it naturally. Until a group has successfully used the method at least once, no session should be ended on a note of defeat. In the beginning, it may be necessary to prepare artificial solutions to be thrown in near the end to reduce the risk of losing faith in the speculative approach.

The use of free association is not easy to master. Fear and feelings of guilt lead to resistance, and obscure insights.

Since speculation is a gamble, there is a tendency to keep such intellectual risks to oneself. Art-

ists and inventors are traditionally secretive, perhaps for this reason. But group creativity depends on group intercommunications. For it to work at all, open speculation must be encouraged.

One help is to meet in a special room where the group is free to argue, move around, and mess up.

More fundamentally, it is necessary to create an atmosphere that permits the utterly free expression of novel ideas—and actually rewards such behavior through group approval. Original ideas need not be practical at the same time; their value can be to stimulate the imagination. Through the process of free association, more useful ideas can be liberated.

At first, there is a tendency toward negative judgment, toward condemning "wild" ideas. Perhaps new groups should be told directly that textbook criticisms are not in order—but that alternative ideas are welcome.

With experience, members lose their fear enough to begin risking impractical speculations. So with experienced groups, criticisms and questions are not harmful.

In the beginning, trick devices can be used to teach the method. Ringing a bell or flashing a light are typical devices. Another technique has proved successful: Only the group leader knows the exact problem the group is supposed to solve. In one case, the problem was to invent a new can opener. The leader simply asked the group to start discussing the word "open."

After the group members learn the method, no trick devices or rules are necessary. A permanent ban on criticism goes against the "free-wheeling" nature of creativity.

Another problem is the time element: It takes time to arouse the creative potential which lies, often untapped, in most intelligent people. A break in the discussion can stop this unconscious energy. And the continuity of thought can be broken.

So fatigue is not all to the bad. Although it lowers the actual number of ideas, it can force the members to take longer chances. Comedy and witticisms take the place of the "coffee break." And if repeat sessions are necessary, the gap can be bridged by recordings. ●

The Product of a "Brainstorm"

This home workshop — power tools on a revolving base — was invented by four men told to "create something that would fill a real need." These excerpts from their "creative conversation" show how they reached their goal:

A: What are the needs of modern man, and what will they be in the future?

B. Lord! There are all kinds of things that I want.

A. What does "want" mean?

B. Let's take the caveman and his family and compare him with twentieth-century man.

D. Think of the caveman coming home and presenting his wife with a saber-tooth tiger for supper. Compare him to a man coming home with a paycheck. He's not a hero, really. He could have been out playing billiards, robbing a bank, or anything -- she wouldn't know.

B: Not only that. Very few of us build our own houses. Another source of self identity and confidence is lost.

A: I figure that is the drive bshind the do-it-yourself movement, the home-workshop hobby.

B: The caveman was forced to do everything.

D: If you are forced to do it, does it satisfy your want?

A: Look at the Eskimo. You may have to build a rugged sled, so you build your sled beautiful as well as rugged.

B: Let's get back to the twentieth-century man who has free time. Let's sum up some of the drives behind do-it-yourself: survival, self-identity, aesthetic, more leisure time, the high cost of labor.

E: As we talk along here, I'm surprised that everybody doesn't do it himself.

B: People are afraid because they have forgotten how to use their hands.

A: That is right. When the automobile came out, the buyers were either mechanically minded or rich enough to employ mechanics. Then cars became more simplified.

B: Whatever we invent will have to be something that doesn't frighten people.

D: I'll tell you one thing that frightens me -- a circular saw.

E: My wife is afraid of jig-saw belts.

A: Let's establish some general principles here.

D: One deterrent to buying do-it-yourself tools: When a man sells his house, he has a hard time moving the tools. Let's assume we are going to have an all-in-one tool.

E: Those tools are already on the market.

A: What's the matter with them?

C: You can't change from a saw to a drill easily.

B: There's not enough choice or versatility.

E: I think our tool ought to be designed with a cheap basic element so that more expensive elements can be added.

B: People will expect it to be automatic.

C: I would like to see the tool built like a "lazy susan" with tools around a revolving table.

B: You could build it like a ferris wheel.

A: Is there anything that will operate like a lazy susan, but have the elegant simplicity of the ferris wheel idea.

B: Maybe you can have a five- or six-sided polygon set at an angle. When one side comes into "focus," the table face is in the plane of the floor.

A: Anybody see any reason why it won't work?

CLOSE CONTROL over production and budget is possible for smaller manufacturers with an inexpensive punched-card installation.

MANAGEMENT'S REPORTS cover current performance, not past history. But accountants and production men must cooperate in . . .

Putting Budget Control to Work

Digested from BUSINESS, Oct, p91

Size is not necessarily an indication of how much budget control a company needs. Many "big little" companies like Franco Signs Ltd. of London, England, with 800 employees and plants at Hendon, Borehamwood, Bristol, and Glasgow, need the same kind of fast, accurate accounting information that corporate giants need.

The "Signs" in Franco's title cover a wide range of products, from small displays to the electromechanical wonders that light London's Piccadilly Circus. Franco also does contract work on aircraft components and other engineering work; and it does sign rental and maintenance business. At all times, thousands of individual custom-designed jobs crowd the floors of Franco's plants.

How do you keep track of such a business? For five years, a 40-column punched-card system has served Franco well. At the top management level, the directors get a monthly report—within two weeks after the month ends. It takes about 10 days to clear invoices.

This monthly report compares the month's performance with the budgeted target, plus a cumulative comparison. The report might show, for instance, that overhead in Department A was unexpectedly high. In addition to the figures, management gets an explanation.

When a deviation from the budget shows up, the chief accountant heads for the shop floor. There, in informal conversation with the production supervisor, he finds out the reason for the difference. As a matter of policy, the chief accountant spends much of his time on the shop floor. Cooperation between accountants and engineers —not the card-punch equipment itself—is what makes Franco's budget-control system work.

Franco rents its punched-card equipment for approximately £100 a month. The equipment includes four punches, one tabulator, one sorter, and one interpolator. There are six operators. This punched-card system costs £100 to £200 a month more than the old "hand-accounting" method.

The system is based, of course, on the details of Franco's operations. To begin with, Franco pays close attention to its annual budget. Since the punch-card equipment was installed, profit targets set in the annual budget have been within 3% of the actual profits. Detailed estimates are made of labor, material, overhead, sales, rentals, and maintenance income and costs.

The operating heart of Franco's system is its job costing procedure. A weekly report on work in progress, broken down by cost figures, gives a reliable guide to the position of all current jobs. Fluctuations in the work-in-progress figures, in relation to budget estimates, call for immediate investigation. To calculate the fluctuations, Franco uses a control account built up from the totals of punched-card tabulations.

Mechanizing its cost accounting was a deciding argument for punch-card equipment in the first place. Here are the details of Franco's procedure:

All employees record the time spent on specific jobs. At the end of the week, the time sheets are sent to the punch-card department for tabulation. (Wages paid are reconciled with these figures).

Overhead, calculated as a fixed percentage, is added to the cards.

Material costs, already punched into cards for purposes of material and purchase control, are sorted and tabulated according to job number. A fixed percentage for overhead charges is calculated and also tabulated.

With weekly subtotals punched, summary cards are punched for labor, material, and overhead charges. These cards are then fed (using the interpolator) into the main work-in-progress file. The interpolator keeps hand-filing to a minimum.

The summary card remains in the file until the job is ready to be invoiced. At that time, the batch of cards is located in the file by interpolating a colored card punched with the job number. Then costing figures are transferred to a job summary sheet, which is designed to show the actual profit on the job.

The punching codes make it simple to segregate cards for tabulating according to date of invoice, branch or department, and the normal headings of accounting. For instance, the monthly report includes a tabulation for non-productive labor, broken down by branch and department, with subtotals giving the specific charges for labor, etc. The tabulations for each item are then compared to the budget estimates.

These tabulations are also used as vouchers to support journal entries. Since monthly forecasts and the yearly accounts are drawn from the same source, there is no problem in reconciling these figures.

After the tabulations are made, the budget-control system rests squarely on the human factor that makes it work: cooperation between production supervisors and the accounting department. ●

Management Looks At . . .

. . . Soviet accounting . . . telephone dictation . . . polka dot hats . . . the company "grapevine" . . . stamina training . . . small office savings.

"SOCIALISM IS ACCOUNTING, in the last analysis," Lenin contended. After a recent tour of the Soviet Union, a Western accountant added substance to the Lenin dictum.

With 92% of production controlled by the state, the Russian government must keep budgetary control on 800,000 organizations. Close to 2 million bookkeepers are needed, and they must produce a flood of financial reports going to each higher level in the system. Books of an enterprise are subject to audit at any time from five different sources.

The accountant, J. S. Deidman, told the *New York Times* that he felt the Soviets would have to "give up some of the tiers of control if they want to give effectual control to management."

However, the Soviets have one advantage: they have set up uniform accounting procedures for all branches of industry.

●

STAMINA TRAINING has solved the problem of training semiskilled workers in a British company. Assembly work in this plant requires relatively high standards of accuracy.

First, exercises based on the assembly elements develop dexterity. Then the trainees go quickly on to full-time production—still under close supervision. They time themselves on one assembly every hour. As their proficiency increases, these "stamina runs" are lengthened.

Average training time is 10 weeks, which is much shorter than the former method. Cost is down, too, in spite of the need for close supervision. (*Metalworking Production, Oct.* 26)

●

POLKA DOT HATS make it easy for management to identify the craft of an individual worker in the 180-hectare area of Tidewater Oil Company's new plant at Wilmington, Delaware (U.S.A.). Color markings include dark blue for boilermakers, white and black for concrete workers, and yellow crossed with green for safety engineers. Pressure-sensitive tape is used for the markings. (*Factory, Nov., p*129)

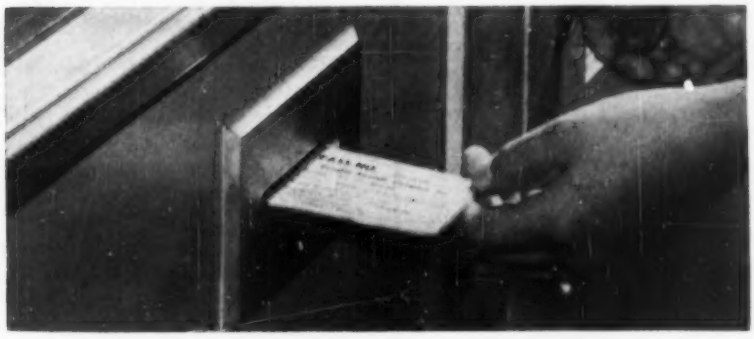
●

THE COMPANY GRAPEVINE—the informal chain of communications in any office or plant—is here to stay, an American professor of management advises. Instead of complaining about the "grapevine," make use of it.

Under normal conditions, 90% to 95% of day-to-day gravevine information—spread informally by word of mouth—is accurate. The grapevine is most active and dangerous during periods of excitement and insecurity—layoffs, equipment changes, etc.

Learn how to live with the grapevine. First, become aware of it. Then learn something about grapevine channels. Discover the opinion leaders in each group and work with them.

When wild rumors start, try to stop the important ones—fast. The most effective rumor-stopping technique, according to Dr. Keith Davis, is a face-to-face supply of facts by each manager. Give the facts with-



Electronics Guards the Plant Door

Three American companies, each doing secret defense work, have adopted a new system of plant security called "Card Key" locks. Cards made of plastic-sealed cardboard are coded with invisible metal particles. An electronic scanner, which "reads" the cards, can be set for about a million combinations—enough to guarantee an exclusive code for any plant.

The Card-Key system replaces metal keys, which can be easily duplicated. If cards get mixed up or lost, the secret electronic combination can be quickly changed and new cards issued. At present, the locks are rented, not sold, by U. S. firm called Card Key Inc., for $10 a month each.

One engineering company has linked a card-key system to its time clock at the employees' entrance. The cards will open the door before and after shifts, and during lunch and coffee breaks. Late employees have to enter through the front door. As a precaution, the cards list only the address of Card Key Inc., and do not show the user's name.

Top-secret defense work at an aircraft company is guarded with card keys.

Another engineering company with weapons-research contracts has six Card-Key locks, with two combinations. "A" cards fit four locks, open entrances to general offices, engineering, and shop areas. "B" cards unlock two doors leading to secret research areas. (*Factory,* Nov, p 105).

"How do you manage to keep well-stocked, but never over-stocked?"

"It's simple— with KARDEX® Visible Inventory Control!"

"KARDEX presents an up-to-the-minute summary of stock on hand...warns of shortages before they become serious, warns of overstocking before it becomes an expensive burden. Orders, receipts, storage and handling costs, usage, markdown — all are charted automatically for quick, easy reference. Kardex not only *systematizes* my stockroom — *it actually runs it for me!*"

•

There are 18,000 Remington Rand Branches and Distributors throughout the world—see your telephone directory for your local representative.

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out mentioning the rumor. If the rumor is repeated, it is remembered as well as the refutation.

Listen carefully to all rumors. Even if untrue, they carry a message. The grapevine is a primary source of upward communication. It is probably the best emotional safety valve for workers ever devised. And, sometimes, it can be used by management in tactical maneuvers. (*Business Week;* Oct 27, *p*88)

•

DICTATION SWITCHBOARD automatically connects any one of 245 remote dictating stations with one of 24 central recorders. Installed in the new offices of Standard Vacuum Oil Company, White Plains, N. Y. (U.S.A.), the Phon-Audograph (above) has a capacity of 400 dictating stations and 40 central recorders—so the system can be expanded if necessary.

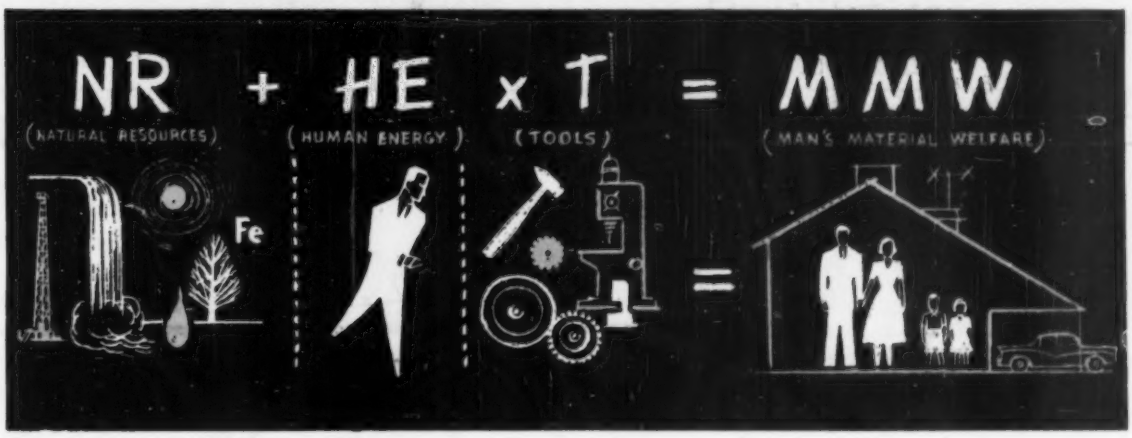
•

SMALL SAVINGS can increase net profits as much as big increases in sales. That is the experience of H. J. Heinz, a U.S. food-processor.

Heinz earns about 3% net profit on sales. So $12,000 saved by converting from secretarial to telephone dictation had as much effect on net profits as a $400,000 increase in sales.

The profit equivalent of $750,000 in sales was saved by converting manually-operated elevators to automatic operation. By reorganizing janitorial services, the equivalent of $450,000 in sales was saved. (*American Management Association Conference News, Nov.*)

MANAGEMENT METHODS continues on p33.



This simple formula explains why tools—from crude rocks to automation—are . . .

Building Blocks of Man's Progress

TODAY, men everywhere are preoccupied with the problem of economic development. Many theories are advanced to explain the nature of growth; and the economists and politicians offer varying prescriptions to encourage, even "force-feed," development.

In working toward higher productivity and rising living standards, businessmen can profit from studying man's progress through past ages. The formula above is one, highly simplified way, of looking at economic history: Natural Resources plus Human Energy multiplied by Tools equals Man's Material Welfare, or progress, or what-have-you.

The more you ponder the formula, the more Tools become the active factor. Natural Resources are constant. Once good diet is attained, the Energy of each human cannot be greatly increased. Thus it falls to Tools to multiply the force of man's puny muscles, and convert and convey Natural Resources to his benefit.

The history of tools is the history of man; he is the only tool-using animal. On the following pages of this special MANAGEMENT DIGEST report is a dramatic illustration of man and his tools. The collection pictured here is as unique as it is priceless: In one giant exhibit, consisting in large part of the original tools themselves, the Wilkie Foundation of the U.S.A. (page 32F) has summarized the entire history of toolmaking.

The exhibit traces the lineage of each branch of the tool family, from the crudest stone fist axe to today's most complex, highly-"automated" machine tool. The simple tools of early man—one for sawing, one for slicing, one for drilling, etc.—are the building blocks of technology. A factory, as well as the machines inside, is a tool. A freight train is a tool. An atomic power plant is a tool.

Perhaps a million years ago, one class of living creatures passed through a specific evolution: The pelvic bone changed, becoming shorter and more nearly upright. Because of this, a being evolved that could walk erect. The hands were freed. And because man was the only animal that had developed an opposable thumb, he became able to grasp and use nearby objects, rocks or bone.

As man's hands developed, so did his brain. He was able to visualize, and contemplate. He began to see the results to be attained through what we now know as basic mechanical laws—leverage, momentum, wedging action. Early man began to choose rocks more carefully, and even shape them to the task.

The next important developments involved multipliers of energy. First came the thrusting spear. Centuries later the spear-thrower, a kind of primeval sling-shot, brought the principle of leverage into play. Then man made a crucial discovery: The bow was the first device capable of storing energy for release when needed.

Some 7,500 years ago the Neolithic, or New Stone Age, saw man become a food producer instead of a mere food forager. He learned to domesticate animals, plant and cultivate crops, and store grain. He organized a communal society, and for the first time began to specialize in different tasks and crafts. His tools began to show signs of this elementary specialization.

Then 5,000 years ago, man learned how to smelt metals. His tools became more precise, efficient, and durable. The wheel was invented (about 3,500 BC) and there followed a grand parade of basic discoveries: the balance scale, the level, glass bottles, sailing ships, measuring devices—the first "standards."

With the coming of the Iron Age, the foundations of Western civilization were laid. Bronze gave way to iron—more durable, much more plentiful. Massive tools were built, allowing the Greek and Roman societies to erect great public works and other engineering projects.

But these civilizations staggered and fell. For

Continued on page 32E

STONE AND WOOD HAND TOOLS

Energy supplied only by human muscle power

MAN-MADE ALL-PURPOSE FIST AXE

SPECIAL-PURPOSE TOOLS

MAN AND HIS TOOLS

Slicing

Drilling

Boring

Scraping

Chopping

Sawing

Burnishing

Holding

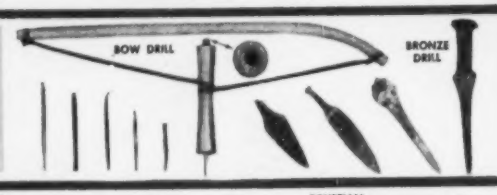
Measuring

FLINT BLADES
FLINT DRILLS
BORED HOLE FOR SHAFT
Hammer axe with hole bored with abrasives Egypt c. 4000 B.C.
POLISHED STONE ADZE
POLISHED STONE CHISEL
POLISHED STONE AXE HEAD
FLINT SAWS
SICKLES
Sharp flints, held in wooden frames by pitch, formed the cutting edge of sickles—straight (6000 B. C.), curved (3500 B. C.).
RUBBING STONE
used to sharpen stone tools
MORTAR AND PESTLE
THONGS
Leather thongs and strips of fibre were used in nets and snares and for lashing handles to stone tools.
"DIGIT"
"PALM"
"LIMB"

METAL HAND TOOLS

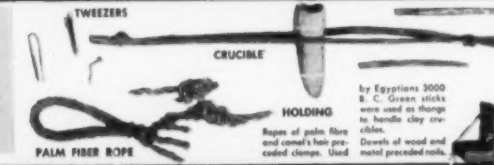
Energy supplied by muscles of men and animal

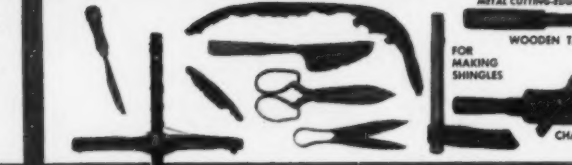
THE BRONZE AGE

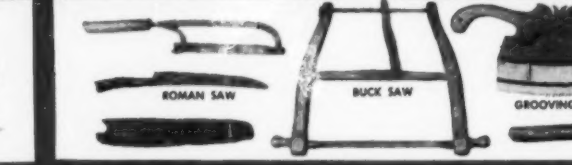


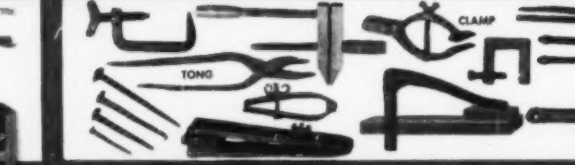
THE SAW
The pull saw was used by the Egyptians from 3200 B.C. to 500 B.C. with little change in design. The small bronze saw blades are European, about 900 B.C.

RUBBING STONE
POUNDING BALL
BURNISHING
Many present day operations of attrition and burnishing are pre-figured by pounding ball and rubbing stone used to surface stone, and by the slate pallets used to powder cosmetic materials.
PALETTE
WOODEN MALLET
FILE


TWEEZERS
CRUCIBLE
HOLDING
Ropes of palm fibre and camel's hair precoded clamps. Used by Egyptians 3000 B. C. Green sticks were used as thongs to handle clay crucibles.
Dowels of wood and metal preceded nails.
PALM FIBER ROPE







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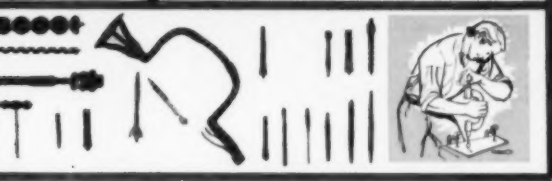
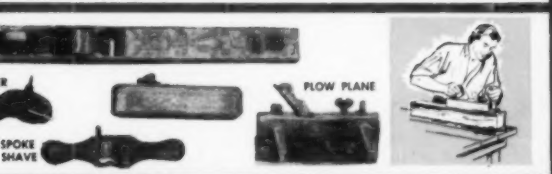
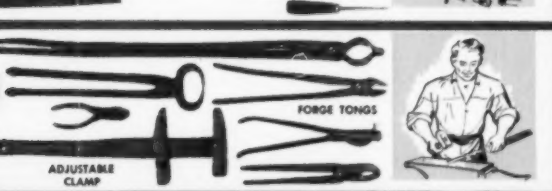
MACHINE TOOLS

Energy supplied by mechanical and electrical power

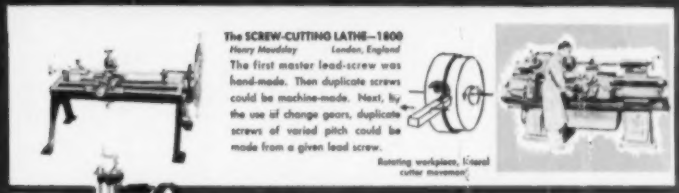
THE IRON AGE



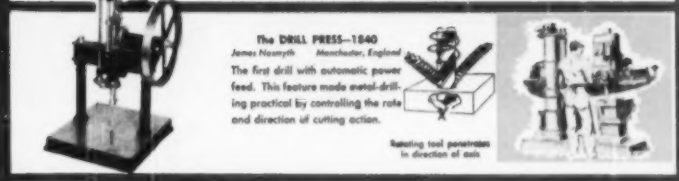




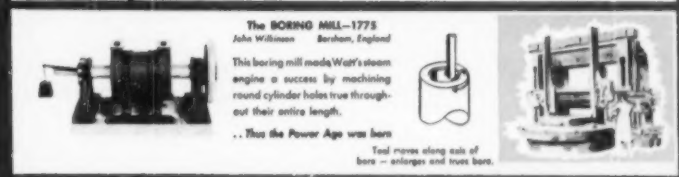
THE INDUSTRIAL REVOLUTION



The SCREW-CUTTING LATHE—1800
Henry Maudslay — London, England
The first master lead-screw was hand-made. Then duplicate screws could be machine-made. Next, by the use of change gears, duplicate screws of varied pitch could be made from a given lead screw.
Rotating workpiece, linear cutter movement

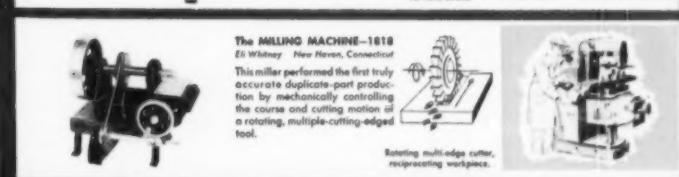


The DRILL PRESS—1840
James Nasmyth — Manchester, England
The first drill with automatic power feed. This feature made metal-drilling practical by controlling the rate and direction of cutting action.
Rotating tool penetrates in direction of axis

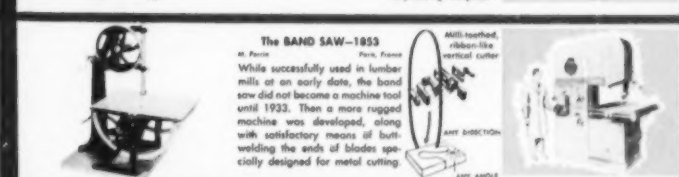


The BORING MILL—1775
John Wilkinson — Bersham, England
This boring mill made Watt's steam engine a success by machining round cylinder holes true throughout their entire length.
..Thus the Power Age was born
Tool moves along axis of bore — enlarges and trues bore.

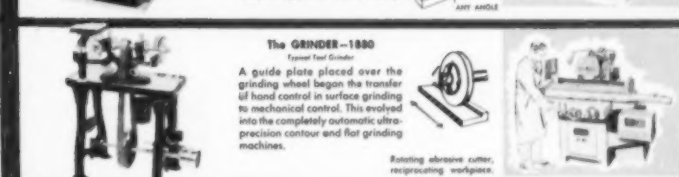
The PLANER—1817
Richard Roberts — Manchester, England
The flat bed and ways of this planer were made with a chisel and file, by hand. It was the first. With it other flat surfaces could be machined with accuracy.
Reciprocating tool cuts on forward stroke



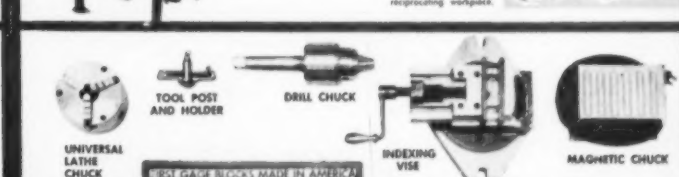
The MILLING MACHINE—1818
Eli Whitney — New Haven, Connecticut
This miller performed the first truly accurate duplicate-part production by mechanically controlling the course and cutting motion of a rotating, multiple-cutting-edged tool.
Rotating multi-edge cutter, reciprocating workpiece.



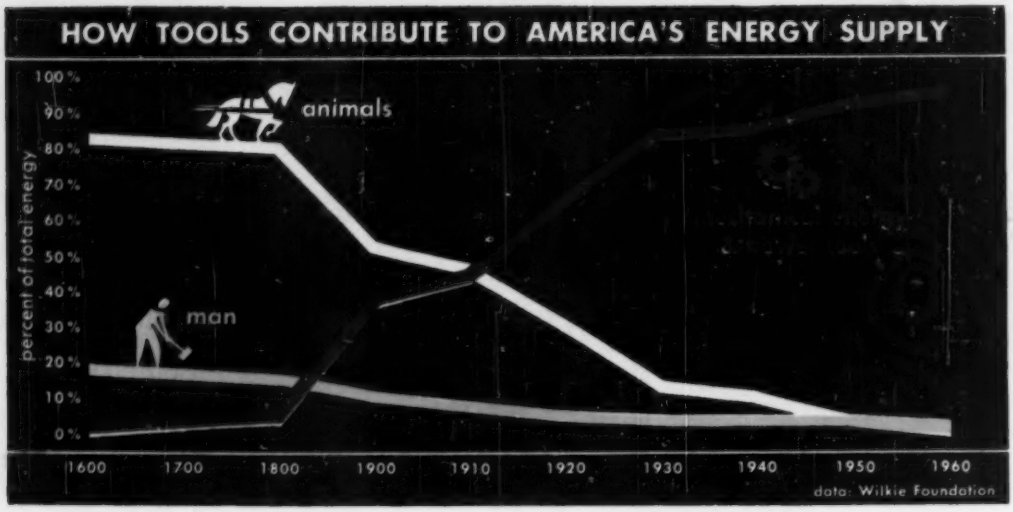
The BAND SAW—1853
M. Perrin — Paris, France
While successfully used in lumber mills at an early date, the band saw did not become a machine tool until 1933. Then a more rugged machine was developed, along with satisfactory means of butt-welding the ends of blades specially designed for metal cutting
Milli-toothed, ribbon-like vertical cutter
ANY DIRECTION
ANY ANGLE



The GRINDER—1880
Typical Tool Grinder
A guide plate placed over the grinding wheel began the transfer of hand control in surface grinding to mechanical control. This evolved into the completely automatic ultra-precision contour and flat grinding machines.
Rotating abrasive cutter, reciprocating workpiece.



FIRST MICROMETER
The first micrometer caliper was made by Brown & Sharpe in 1877. In 1867 they made a sheet metal gage of similar design but with smaller throat.
GAGE BLOCK GAGES
Today, gage blocks make possible precision measuring instruments with millionths accuracy by using such methods as the Micro-Step Gaging System.



centuries tools were scarce, and technology remained virtually dormant. There was little energy, or innovation.

Slowly at first, then faster, an era of rapid advance took shape. In the 15th Century the printing press made detailed information available to many men; they could now compare and copy. The age of science and exploration began. And the forces that were to create the Industrial Revolution began to gather momentum.

The key to industrial development was the tool driven by mechanical power. The idea is simple. Such a tool consists of a mechanical means for holding and controlling both the workpiece and the tool—thus replacing man's arms and hands. These devices are supported and guided by a rigid metal framework, replacing man's body. And steam power, transmitted through gears and belts, replaces man's muscles.

For the first time, man could transmit, modify, and multiply force in order to produce a part to a predetermined size and contour. In combination, these tools were capable of reproducing themselves. The concept of mass production became practical.

But someone had to "discover" the concept and put it to work. The discovery is often assigned to Eli Whitney, an American who had invented the cotton gin. In 1798, Whitney offered to make in two years time 10,000 muskets for the American government. It was a task that would require more gunsmiths than were living in the new, small United States.

But Whitney had resolved to do it differently, to break with the tradition of having each workman make a complete gun. He wanted to develop a series of tools, and have each make only a single part—in large quantities, and all alike.

The scheme worked. And the idea of interchangeable parts proved sound.

Since Eli Whitney, tools performing the basic tasks of metal machining—milling, drilling, grinding, etc.—have developed speeds and accuracies undreamed of 50 years ago. Linked together, they make products beyond Whitney's wildest fancy. And now, man's skills have carried his tools into a second "Industrial Revolution."

For lack of a better word, it is called "automation." The machine controls itself, obeying programs designed into it. Already the process is far along. There are machines that have a kind of rudimentary "judgment," monitoring their own work and making corrections. On the horizon is an even higher order of machinery—with the ability to do some of the routine "design" of the product being worked on.

Basic machinery and tool making is not usually thought of as "growth" industry in the same terms as the more highly publicized chemical, plastics, electronics, and paper industries. Yet studies in the U.S.A. and elsewhere suggest that compared to most other industries, the tool and machinery makers will be marketing the highest proportion of new products in 1960. In short, the drive for more output and rising standards of living is reflected in a surging demand for more efficient tools.

There is a footnote to this view of tools and their contribution to civilization. Of the various factors in the formula—Resources plus Energy times Tools equals Man's Material Welfare—only the last is open to differing interpretations by the philosophers and politicians.

For example, today the Soviet Union and Eastern Europe are blessed with resources, energies, and an increasing array of fine tools. Yet there is some doubt whether the individual has benefited in proportion to these nation's application of resources, energy, and tools.

Certainly the Poles and the Hungarians have raised the question, and demonstrated—many of them with their lives—that something is wrong.

There is only one answer, say the men who devised the formula. It can work only in an atmosphere of freedom, where an individual's initiative is rewarded with a better life. ●

Leighton Wilkie (above), a tool maker, talks to a factory group about the economic history of man. It's one way an American businessman goes about . . .

Selling a Nation on Its Tools

LEIGHTON A. WILKIE is a tool maker. He is also a tireless student of ancient man. His eyes flash with anticipation at the mention of a new theory of Man, or word of an important archaeological discovery along the Nile. It is more in this second capacity that he is shown above lecturing on the history of man and his tools, using part of the same exhibit displayed in this special MANAGEMENT DIGEST feature report.

Wilkie, and the Wilkie Foundation which he heads, are trying to put across a public education campaign in the U.S.A. The aim is to emphasize the importance of rising productivity in American life, and the role tools play in gaining that productivity.

This type of educational effort is often launched by industrial trade associations in the U.S.A., by a few large business and financial institutions, and by several of the larger, non-profit foundations. You find it less frequently among the small foundations and among individuals, such as Leighton Wilkie.

But Wilkie believes the effort is badly needed. Mid-20th Century economics is barely understood by most Americans. And tools are taken for granted, a not-too-interesting necessity of life. So Wilkie is trying to promote better understanding by combining his vocation as a tool designer and manufacturer (he is chairman of the DoALL Co., Des Plaines, Illinois), and his hobby as an anthropologist. And he is having fun, and gaining satisfactions that many modern management men might envy.

Moreover, it is good business. Although the Wilkie Foundation is strictly non-profit and non-commercial, it cannot help but create some goodwill among potential buyers of all tools, and Wilkie-made tools in particular.

The Wilkie Foundation was organized and endowed by Wilkie and his two brothers in 1951. Soon it conceived the idea of the historical project, and resolved to bring together—in graphic, easily-understood form—a history of man and his tools. With the Wilkie brothers in the van, the Foundation ranged the world, contacting scholars, museums, educational institutions. It searched out information, and hunted fossils, original tools of early man, and scale models of the first larger tools. Much of the exhibit is authentic. But when a tool or fossil was unavailable, the Foundation made detailed copies.

Once the tools were assembled, the program began. Large color posters of the exhibit, with explanatory text, were made available to hundreds of thousands of students.

A traveling exhibit of ten large panels, with a lecturer (sometimes Wilkie himself) was presented to some 40,000 persons in engineering societies, universities, factory and management meetings. Now a new, much larger exhibit has gone into Chicago's Museum of Science & Industry, visited by 3-million persons each year. In addition, there has been radio and television publicity.

This year, the Foundation hopes to make a motion picture. And it plans, some day, to take the picture, or parts of the exhibit, overseas.

The cost has been high (the Foundation won't say how much)—both in terms of money and manhours. Unlike many Foundations, this one does not generally make grants to outsiders, and does most of the work itself. Besides the tool history, the Wilkie Foundation has done development work in solar energy, with particular interest in the arid and underdeveloped—but potentially arable—areas throughout the world. And the Wilkie brothers themselves have been interested in a range of other projects: an apprentice-training system, oil-seed extraction and silage-preservation methods, orchard development, and several new vehicle and machine designs. ●

A MEMO FROM MACHIAVELLI

How to Succeed in Business Politics

Digested from HARVARD BUSINESS REVIEW, Nov-Dec, p25

MODERN HUMAN RELATIONS THEORY and practice—mutual confidence, open communications, participation, and an atmosphere of democracy—seem hard to reconcile with the maneuvering and power plays that go on in offices and factories all over the world every day.

Executives have power and use it—to do their job and, in many cases, to strengthen and enhance their own positions.

Power cannot be given; it must be won. Men can exercise only the power that other men allow them. The ultimate source of power is the group—made up of people with emotions and tenaciously-held values.

The real question is: How can power be used most effectively? What are some of the political strategems which the manager must use if he is to carry out his responsibilities and further his career? This is an area that businessmen have avoided—as if it were something to cover up. But facts are facts. Closing your eyes will not change them.

The manager must develop a definition of executive behavior that includes both the idealism of democracy and the practicality of politics. One way to reconcile the two is to say that the way power is exercised is neutral. In this theory, power can be used for good or evil. Deliberate and skilled use of power means responsible use of power.

But this brings up the age-old controversy: the means versus the ends. If the way you conduct your relationships doesn't have moral value, what human activity does?

There are other approaches, but they too are filled with internal contradictions. The conflict between power and democracy and enlightened management is unrelieved. The riddle is unsolved.

BUSINESSMEN FACE THE CONFLICT every day in countless situations. The most successful managers seem to have evolved, consciously or unconsciously, a consistent pattern of political behavior; some have no doubt studied the teaching of Niccolo Machiavelli in *The Prince*. Watch, and you will see them following these eight tactical principles:

Taking Counsel. The able executive is cautious about how he seeks and receives advice. He takes counsel only when he desires it. A vague sort of policy that states, "I am always ready to hear your advice and ideas on anything," wastes time, confuses issues, dilutes leadership, and erodes power.

Making Alliances. In many respects, the executive system is a complex of sponsor-protege relationships; they provide channels of advancement for proteges, loyal groups of followers for the sponsor. To protect and improve his status and sphere of influence, every executive needs a devoted following and close alliances with other executives on his own level and above him.

Communication. It is not good strategy to communicate everything one knows. It may often be advantageous to withhold information, or to time its release. Information is a tactical weapon.

Compromising. The executive should accept compromise, as a means of settling differences, with his tongue in his cheek. While appearing to alter his view, he should continue to press forward toward a clear-cut set of goals. To retain power, it may be necessary to give ground on small matters, to delay, to move off on tangents, even to suffer reverses. But concessions should be more apparent than real.

Negative Timing. Sometimes pressure for action the executive disagrees with comes from sources he would be wise to ignore—the expectations of subordinates, the influence of associates on his superior, the demands of tradition. But to refuse might threaten his power. In such situations, the executive may find it wise to initiate action but retard progress. He busily studies and plans, but nothing happens. The program "dies on the vine."

Self Dramatization. The skill of the actor—whose communication is "artistic" rather than "natural"—can be an asset to an administrator. How can an executive learn to dramatize himself? First of all, he must develop sharp powers of observation. Pay attention to how a successful man handles himself, not just what he does or says. Training can provide control over the voice, gesture, and posture.

Confidence. Once an executive has made a decision, he must look and act decided. The man who constantly gives the impression of knowing what he is doing—even if he does not—is using his power and increasing it at the same time.

Always the Boss. Warm personal relations have sometimes been considered the mark of a good executive. But in practice an atmosphere of cordial friendship interferes with the efficiency of an operation, and tends to limit the power of the manager. No matter how cordial he may be, the executive must draw a line of privacy which cannot be transgressed. In the final anaylsis, he must always be the boss. If the "open-door" policy is good strategy, he must ask: "How far open?"

U. S. RECRUITERS are ushered into London University by the Beadle for a visit that leads to . . .

. . . an interview with engineer Gerald Power, who says he wants to work for a U. S. company . . .

U. S. Companies Search for Talent

Digested from BUSINESS WEEK, Nov 10, p190

British engineers filed into a small suite in London's Westbury Hotel one day three months ago, chatted briefly with a dark, chunky American, then left. Today, one of them, Gerald A. Power (above), once an electronics engineer for a British tape recorder manufacturer, works at his trade in Rochester, N. Y.

The American who interviewed Power in London was 49-year-old Amerigo D'Agostino, a New Jersey attorney who heads Amerigo D'Agostino Associates and spends his time recruiting engineers and scientists abroad for U. S. companies. Some of his clients: General Electric Co., Lionel Corp., Mergenthaler Linotype Co., Sunbeam Corp., and Monroe Calculating Machine Co.

D'Agostino and his recruiters fish for engineers only in foreign waters, mostly in Western Europe and the United Kingdom. They and other independent recruiting specialists supplement the work of corporations' own "talent scouts."

Since the Korean War, the demand for scientific personnel, in the U. S. and throughout the world, has far outstripped supply. The growing shortage is forcing the Americans to cross the Atlantic in their man-hunt.

The American companies offer foreign engineers attractive lures —including large salaries. And in countries like Italy, where the young engineer serves an apprenticeship of three or four years at $100 a month, money is the prime lure. His counterpart in the U. S. can emerge from college into a $425 to $450 monthly salary. This differential holds for experienced engineers, as well.

Money isn't always the most intriguing facet of life in America, though. A young Swedish engineer, fresh from a university, can get only $200 to $250 a month in his own country—about half the going rate in the U. S. A. But in terms of the purchasing power of his take-home pay, he's better off staying in Sweden.

The attraction for most foreign engineers, the recruiters say, isn't merely higher pay. There is the prospect of speedier promotion in the U. S., and the chance to study at company expense. Many European companies consider promoting a man only once in two years, compared with the American practice of reviewing a man's progress every six months. Gerald Power felt frustrated by the traditional stratification of British industry.

Transfers across the sea are encouraged by the fact that scientists and engineers with certain specialties in short supply in the U. S., are available in some foreign lands. For example, European universities graduate four mathematicians for every three available jobs; American universities produce far fewer than industry requires. Some foreign countries have a surplus of stress analysts, hydraulics and computer engineers.

Actually, the shortage of engineers and scientists is worldwide. Companies around the globe are engaging in a great, confused game of musical chairs. The U. S. A. and Canada get men from each other and from England and Europe; England gets them from the Continent; Europe, Africa, Latin America are engaged in a round robin of their own. Almost every nation complains noisily about the foreign forays, but they are all doing it themselves.

The cost to a U. S. company of hiring a man with D'Agostino's help runs to about $2,200. First there is a retainer of $250 to cover

. . . and later Mr. Power's family learn they are going to live in the U.S.A.

Overseas

out-of-pocket expenses (minimum order: five men, $1,250 for expenses). The client also promises to underwrite transportation costs up to the plant door for a man and his family, and provide $100 for freight expenses, a maximum of $300 for a month's living expenses after the man arrives in the U.S.A. The company also pays for passport, visa, medical examinations. D'Agostino's fee from the company is 10% to 15% of the man's first-year salary; the recruit pays nothing.

For the foreign engineer to enter the U. S. as a permanent resident, he must come in under the immigration quota for his country. If the quota is undersubscribed, he merely applies to the nearest American consul in his country and gets a visa—after passing a medical examination. If his family plans to accompany him, each member must pass a medical checkup.

When a man is hired by D'Agostino, he agrees that if he voluntarily leaves his job within two years, he must return what the company spent to bring him to the U. S. A.

Out of about 150 men hired by D'Agostino so far, only one has failed at his new job. ●

▶ YOU AND YOUR PERSONAL AFFAIRS

Do you get butterflys in your stomach when you are asked to give an after-dinner speech? If you take the advice passed along by the British Journal *Business* recently, you can train yourself in public speaking.

After all, *Business* points out, in one way or another you practice public speaking all day long.

When you get up before a group, stand still—and relax. Learn to stand poised and you've won half the battle. Speak musically, in "curves" of sound; this takes practice. And don't be afraid to pause and give your listeners time to absorb what you have said. It also gives you time to marshall your facts before going on.

Changing your pace of delivery and voice pitch will keep your speech from becoming monotonous. This also means practice.

A mistake often made is to apologize for lack of speaking ability. It is important to appear confident whether you are or not; don't begin by apologizing for deficiencies you haven't shown. Try to look confident even if you feel like dying. The biggest barrier to public speaking is your own mental attitude.

The public speaker is like a comedian: Being spontaneous is a question of technique and timing, not natural ability. To be effective, humor must rise naturally out of the subject matter. So do not announce that you are about to tell a joke.

But first of all, prepare your speech. There is nothing shameful about adapting witty sayings to your own use: Shakespeare did it all the time.

●

Though you read English, you—and certainly your non-English-speaking colleagues—may welcome the International Visitors Center in New York. If you are coming to the States, this linguistics and travel service will meet you at the pier or airport, makes hotel reservations, provide a guide and interpreter, and arrange business appointments and tours.

The center has a staff of 20, plus a pool of 200 special translators. These linguists include professional people such as businessmen, lawyers, and engineers. For standard interpretation, the center charges $10 an hour or $40 a day, plus expenses, for a normal six to eight-hour work day. Interpreters for multilingual conferences cost $50 per day, plus expenses.

One language problem of the visiting businessman, the center says, is often differences in usage. For instance, note these European versus American words: "exploit" versus "operate," "director" versus "manager," "propaganda" versus "advertising."

Address: International Visitors Center, 665 Fifth Avenue, New York City.

●

The Swiss have come up with a useful plan for the harried international motorist. Members of the Swiss Touring Club can now get an international letter of credit that will be honored in 12 European countries. The credit is good for car repairs, ambulance charges, doctor's and lawyer's fees. Local auto clubs pay the bills, and are reimbursed by the Swiss club, which in turn bills the member.

Ironing tables are not big items in world trade. But Britain's R. Turner Hood (right) found them ideal for . . .

Breaking into the American Market

Digested from BUSINESS, Oct, p95

Ironing tables, or boards, are hardly the most important or glamorous item in international commerce. Most nations are probably "self sufficient" in ironing boards, and imports are probably very small indeed. So few manufacturers have been tempted to try and corner the world market.

But Bradley & Co. Ltd. (Bilston, England) has thought differently. In five years' time, it has become the largest manufacturer of all-metal ironing boards outside the U.S.A.; it is selling them in Europe, Latin America, and Asia —as well as in North America and the British home market.

Bradley's success with ironing boards is the result of careful, personal market research—much of it on the part of R. Turner Hood (picture), Bradley's managing director. In 1951, he picked the U.S. and the Canadian market for his major target. In the years since, he has made nine business trips across the Atlantic—and, not coincidentally, Bradley & Co. is working on the ninth improved model of the original metal board.

In five years, Hood has sold over 250,000 all-steel boards, worth over $1-million, in the North American market, already crowded with hundreds of inexpensive, serviceable ironing boards.

Here is a step-by-step account of Bradley's ironing board story:

In 1951, Bradley & Co. entered a market it knew almost nothing about. A designer had approached Hood with a design he felt suitable for the U.S.A. Hood set his staff working on plant and price data, then took a prototype ironing board to New York. He located business friends who were interested in a quality product. He exchanged agency rights to Canada and the U.S. for an initial $300,000 order for 100,000 ironing boards—on condition that Bradley could meet the suggested buying price.

Next, Hood visited American plants making similar products (and invited the Americans to Bilston). He picked up critical information. For example, American housewives prefer metallic "glow" colors to the traditional British kitchen shades of cream and green; and this finish is applied with electrostatic spraying equipment.

Upon his return, Hood's first-hand findings were added to the technical research done by the Bradley staff. A custom-built 500-ton press was needed to make board tops; the paint sprayers had to be imported. The final verdict was favorable: The ironing boards could be manufactured within the price limit.

Meanwhile, Hood had to convince British authorities to allocate scarce steel for ironing boards; he got the steel by promising to export 80% of production. A way to strengthen cheaper grades of metal tubing was found. Customs duties had to be negotiated with the American government. (Since Bradley was the first company to export steel ironing boards to the U.S.A., there were no applicable tariff schedules.)

As the ironing boards began arriving in the U.S., Hood heard that many were damaged in transit. To cure that, he arranged for photographers to take pictures of the boards at every stage of their journey—trucking, ship loading, stacking, storing. A new shipping carton was developed, and new handling instructions issued.

Later there were some complaints that the boards were not stable enough in use. So Hood ordered ironing boards from all over the world shipped to Bilston for study, and adapted some of their best features for his own. Then he visited local retailers in many North American cities. Hood collected information right in the store from customers who bought Bradley boards: "Why did she choose that one?" He asked questions on color, ironing height, storage.

With the first 100,000 order completed, Bradley was ready to start on a second order with a redesigned board and a highly efficient production line. Then calamity struck. A price war in the U.S. market cut profit margins to the bone, and forced Bradley's agent to discontinue the ironing boards.

Fortified by experience gained on his previous trips, Hood took off for North America again. He went directly to store buyers and made sure they were still interested in the Bradley boards. With this assurance, Hood appointed a new agent in the U.S., and he decided to take on the Canadian market himself.

While in the U.S., Hood made another tour of retail outlets to interview customers. In less than three weeks, he covered 32,000

kilometers. This time he concentrated on what kind of accessories were used with the ironing board.

Widening distribution brought new freight and shipping problems. The shipping package was again redesigned. All the while, Bradley's engineers improved manufacturing methods.

When the sales curve flattened out, Hood packed his bags and again made the Atlantic crossing. He offered his services to the sales organizations handling the boards. He even taught salesmen how to demonstrate the board. Another interviewing trip followed—and an improved design resulted.

Bradley is currently producing its Mark VIII ironing board. The company is also selling a dual-purpose kitchen chair in Britain—a product that Hood noticed on one of his American trips. ●

Marketing Men Look At . . .

. . . a dynamic French exporter . . . "value added" by marketing . . . instant coffee for Europe . . . and the ratio of advertising investment to sales income.

FOREIGN SALES quadrupled in five years and rose from 30% to 70% of total production for a small French manufacturer of textile machinery.

With a record like that, competitors weren't surprised when Etablissements Maurice Heliot won last year's award for the best performance in foreign markets by a small French enterprise.

The award included a check for a million francs ($2,857), presented by the weekly magazine *Informations Industrielles et Commerciales,* and 20,000 kilometers of free air travel contributed by Air France. The prize will be used to further expand foreign sales—emphasizing the importance of "travel and presence" in winning foreign customers.

Maurice Heliot started his export effort by entering the nearby French-language markets in Belgium and Switzerland.

Soon, he expanded to Holland, Indonesia, Spain, Britain, Italy, and Austria. Next, he attacked the redoubtable German market; and the company now sells more to Germany than any other country. The travel awards will be used to survey Heliot's next targets—Japan and the U.S.A.

Heliot has managed to keep prices down by increased productivity—up 30% in five years. Current prices are equal to the 1952 level, with no loss in profit.

Heliot has developed definite methods for operating in its foreign markets:

- To approach the market, the company advertises in reputable trade journals.
- The customer is made to forget he is buying from a foreign company. Correspondence is in the customer's language; salesmen speak his language; and native-language catalogs are available.
- Installation charges include only the living expenses of the Heliot engineer.
- The firm tries to bring out at least one new machine a year that will compete in world markets.

●

DISTRIBUTION COSTS frequently catch management's eye as a place to make new savings. But at the recent Boston Conference on Distribution, businessmen spoke out for the idea that distribution is a "value added," not a "cost."

To help promote an understanding of the role of distribution, marketing men got some good advice at the conference:

First, marketing men themselves

The War for Soap Markets Gets Hotter

The international marketing war is hottest of all between the three giants of the soap business—the British-Dutch Unilever organization and two challengers from the U. S., Procter & Gamble and Colgate-Palmolive. Price cutting and promotion expenses have squeezed profits. In one year, Colgate's European profits decreased $1.2-million with a $12.9-million increase in sales.

And competition does not stop. Procter & Gamble recently paved Rockefeller Plaza with soap bars (above) to introduce its new "pink Camay." Such stunts are becoming commonplace around the world.

Whoever is first with promotion and distribution of a new soap product usually continues on top. So the industry looks ahead—and sees synthetic-detergent soap bars.

The best promotional feature of the detergent bar is its sudsing performance in "hard" water (containing mineral salts). But the hard-water market is small. Also, detergent bars are more expensive than soap and they don't have the same "feel."

Nevertheless, Lever Brothers, Unilever's U. S. subsidiary, is approaching a U. S.-wide market with Dove, a detergent bar which contains cleansing cream.

In the frenetic soap business, competitors quickly adopt the characteristics of the leading brands. Currently, all major companies are test-marketing detergent bars, pastel colors, and deodorant additives. Foil wraps are gaining favor.

Where one soap company goes, the rest are sure to follow. (*Chemical Week, Oct* 20, *p*100) ●

need to know more about distribution costs. Few are fully aware of how much of the cost of the final product is made up of distribution costs. Second, marketing men must promote the idea that marketing "is a function of management." (*Business Week, Nov* 3, *p*60)

●

"INSTANT" COFFEE will soon get an aggressive push in world markets. Coffee growers watch the spread of the soluble product with anxious eyes because it uses fewer beans per cup.

A new corporation called Ibenco, Inc., has hopes to develop a world-wide market for soluble coffee. A plant to blend and package the product in Canada will soon be opened. Plans are underway for another factory in Europe, probably in Holland. The coffee will be made available to local distributors for packaging under their own labels.

Ibenco is owned 50-50 by the International Basic Corp., which is backed by U.S.A.'s Rockefeller interests, and Tenco, Inc., a soluble-coffee producer jointly owned by 10 coffee companies.

●

ADVERTISING-TO-SALES RATIOS of major U. S. industries are not as large as many people believe, according to a recent study. The ratio varies greatly between industries. Within industries, smaller companies usually spend more on advertising per sales dollar than larger companies. Here are percentage ratios of advertising expenses to total sales for 15 different industries:

Gasoline and oil	0.67%
Food and beverages	0.27
Automobiles	1.08
Products for industry	0.29
Metals for industry	0.16
Utilities	0.12
Transportation	0.30
Aircraft	0.11
Chemicals	0.50
Rubber products	0.62
Toilet goods, drugs	4.49
Clothing, fabrics	0.39
Office equipment	0.49
Tobacco	4.41
Alcoholic beverages	5.80

(*Printers Ink, Oct.* 26, p21)

▶ FINANCIAL DIGEST

Currency values fluctuate enough in normal times to tax the wits of the wisest international businessman. In times of crisis, the same rules of money management apply—only more so.

Most businessmen learn the "tricks of the trade" through hard experience. But to speed the process, and to let experienced veterans review the fundamentals, some American corporations are sending high-priced executives to night school, the *Wall Street Journal* reports. In a series of night lectures, Franz Pick, a Czech-born monetary expert who publishes a business service and currency yearbook, leads his students through the maze of the international money market.

For instance, the use of "clearings"—buying needed foreign currency in a country that is selling its excess holdings at a discount—is an every-day practice to many businessmen, a revelation to others.

Another lesson in money management is hedging against the rapid deterioration of local currencies. For instance, three years ago a dollar would buy about three Colombian pesos on free markets. Today, the dollar will buy over six. The lesson for businessmen: It is better to borrow pesos in Bogota for plant expansion in Colombia than to invest dollars or another hard currency. For if past performance holds true, the dollar will bring even more pesos when the loan payment falls due.

The same principle holds for currencies under pressure. Businessmen should move with caution in respect to British pounds and French francs. Both these countries have the resources to keep free markets in check by buying their own currencies with gold or dollars. However, this drain can be supported for only a few months. Sterling is under heavy pressure. And many experts predict that France will finally be forced to devalue the franc. So businessmen should keep close watch on the pressures operating on the British and French currencies.

By the same token, a "hands-off" attitude toward Egyptian currency is indicated. This country has apparently mortgaged the entire proceeds of its cotton crop—which brings in 80% of Cairo's export revenue—for the next five years to pay for arms. Also, Britain and France are still blocking Egyptian accounts. Hard currency will be scarce in the Egyptian treasury.

With the world in a crisis of uncertainty, pressures on currencies are greatly intensified. Investment capital tends to move away from the critical areas to safer fields. Transfers of investment capital from Europe to Canada, for instance, helped in November, to push the Canadian dollar to a 22-year high in relation to the U. S. dollar.

●

Memo to companies negotiating with American firms: The U. S. Supreme Court has ruled that an American company can be forced by U. S. courts to compete in foreign lands even if it has promised foreign competitors it will not sell in their markets. In the light of this ruling, U. S. companies will find it difficult to enter into informal market-splitting agreements with foreign companies—for doing business anywhere in the world.

The Auto Industry's New-Model Year

The world automobile industry has finished introducing its 1957 models, and is looking into the future warily. Feelings are mixed: True, demand is growing everywhere; more and more persons are able to afford a small car. But what of increasing international tension, or oil, steel, and shipping shortages?

In the U.S.A., the automakers talk of a "normal" year in 1957. Most observers agree that the industry overproduced in 1955, returned to a more realistic basis last year, and can look forward to a 1957 quite like 1956.

There is one promise of excitement coming in the U. S. Later in the year, Ford Motor Co. will bring out a brand new automobile—called the "Edsel." With the new line, Ford hopes to begin competing with General Motors Corp. on a car-for-car basis.

Last year was particularly difficult for British auto makers. Abroad, sharp cuts in Australian and New Zealand import quotas hurt. At home, a higher purchase tax and an intensified credit squeeze combined to hold sales down. Now another factor has complicated the picture: Gasoline rationing may force many undecided buyers to postpone their purchases. And beyond that, Britain's auto industry will suffer from the effects of the Middle East crisis.

Meanwhile, the industry expects increased competition in its export markets. To meet the challenge, many improvements have been made in British models. Automatic transmissions and higher engine horsepower are examples. In addition, several manufacturers have completely restyled their autos.

Britain's chief rival—Germany—also expects more intense competition—especially for its best-seller, the Volkswagen. British, Italian, Swedish, even Czech and Russian small-car manufacturers are trying to cut into VW's markets. Despite competition, and international uncertainty, the Germans confidently expect to at least

Continued on p 40

FREGATE (Renault, France) is largest of three Renault models. Car now has a new four-speed gearbox with full synchromesh and direct drive in top gear. Dauphine, second model in Renault's line, is classed as a small car but offers two-pedal control. It is larger and more powerful than Renault's tiny 4cv and is already the company's best seller. Price: Fregate, 660,000 fr.; Dauphine, 490,000 fr.

VANGUARD SPORTSMAN (Standard Motor Co., Ltd., England) accelerates from a standstill to 60 miles per hour in 15 seconds and has a top speed of 90 to 100 miles per hour in overdrive. The overdrive unit is supplied without extra charge. Gasoline consumption is claimed to be between 28 and 32 miles per gallon. Radiator grille has been redesigned. Interior is furnished and equipped with the latest materials and styles. Price £820.

PLYMOUTH (Chrysler Corp., U.S.A.) shows a complete styling change. Rear fins are accentuated; windshield wraps over the top as well as around the sides and the car is longer and lower. Mechanically, there is more power in the engine. But newest engineering development is the front-end torsion-bar suspension. This plus half-stiff, half-soft rear springs permits a soft, level ride on rough roads, sharp curves, or in deep sand. Price: Belvedere, $2,086.

equal 1956's record year—and continue pushing export business. More cars will be made available to the home market, but Germans can still expect to wait months for a new Volkswagen.

The Italian automobile industry is all smiles—with good reason. Last year's production was about 15% higher than 1955 and this year should continue the pattern. Italians base the industry's growth on the type of cars produced—light and inexpensive. The cars are designed to meet the requirements of those markets where fuel is costly.

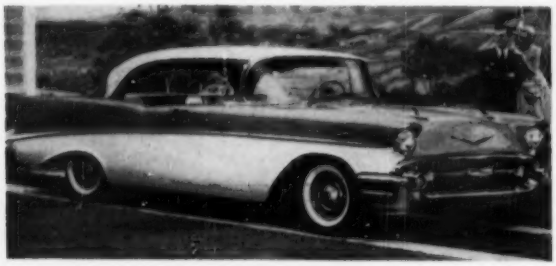
French manufacturers remain primarily interested in the home market. With a record year behind them, they see a still better year in 1957. One reason is that more people who have never owned cars—factory, office workers, for instance—are now buying them. Credit sales are on the increase—nearly 30% of new cars are bought with "time payments."

Japan will continue to depend on assembly of imported parts for many of its automobiles. But this will gradually change. By the end of last year, Japan was making all the parts for the British Hillman and the French Renault. Large cars are still in the future even though demand is rising. One obstacle is cost; even small cars are too expensive for the average Japanese.

Compiled from reports in The American Automobile and other sources.

ZODIAC (Ford Motor Co., Ltd., England) can be fitted with a Borg-Warner automatic transmission at extra cost. Ford Zephyr also offers an automatic transmission making it the lowest-priced British car to do so. Price: Zodiac, £835; Zephyr, £740.

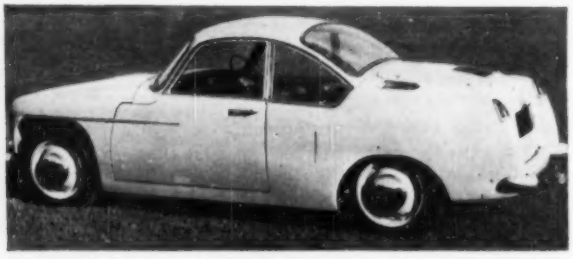
MERCURY (Ford Motor Co., U.S.A.) bases its new styling on its "dream car" Turnpike Cruiser. Mercury is marked by thinner, flatter roofs with formed paneling and by slanted rear fenders with concave "sculpturing." Price: Montclair, $2543.



CHEVROLET (General Motors Corp., U.S.A.) has a new front for 1957. Rear of the car is unchanged, except for the bumper, tail lamps and trim on rear fenders. Car is longer, lower, more powerful. Fuel-injection system is optional. Price: Two-Ten, $2037.

GOGGOMOBIL COUPE (Hans Glas, GmbH, Germany) seats two in a roomy interior. Gearbox, engine and differential are combined in one block. Complete line, coupe, limousine and transporter, will compete with Volkswagen. Price: coupe, 4000 DM.

FLAMINIA (Lancia & Co., Italy) body has been designed by Pinin Farina of Italy. It is a full-size 4-door saloon car with wrap-around windshield. Six-cylinder is a V-type. Transmission is mounted behind the rear seat. Price: probably over 2.5-million lire.



ROVER sports car (Rover Ltd., England) has been designed around a lightweight, high torque, 110-horsepower gas turbine mounted in the rear. Four-wheel drive prevents wheel spin on starting. Company says is has no firm production plans as yet.

CUTTING PARTS FROM THE SOLID
. . . 19% saving in time

AUTOMATIC SPLITTING
cutting time reduced from
10.8 to 3.6 minutes.

DoALL

Presents INDUSTRY's NEWEST TOOLS for

Machining . . . Grinding . . . Measuring

Here are *new* types of tools to do hundreds of different jobs more efficiently than they have ever been done by previous machines and methods. These new tools offer you:

Greater output per man hour . . . greater productivity per dollar of investment in equipment . . . better quality of work . . . greater range of application and usefulness . . . substantial savings of materials being worked . . . lower tooling and fixturing costs . . . faster changeover from one job to another . . . less non-productive downtime.

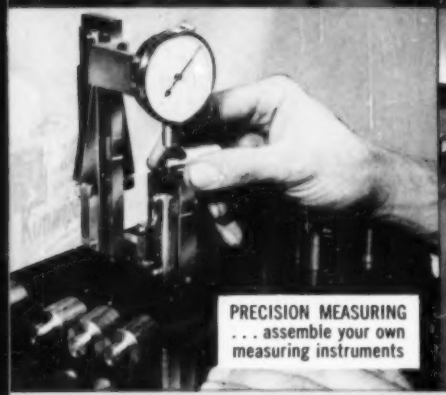
Shown here are examples of a few of the hundreds of money-saving applications performed by DoALL Band Machines, Power Saws, Surface Grinders and Gaging Systems. Substantial savings in time and money were made on every one of the jobs shown when DoALL's equipment was employed in place of other types.

Please turn the page for details . . .

AUTOMATIC CUT-OFF SAWING
. . . in ½ the time of
power hack saws.

AUTOMATIC SLOTTING
. . . up to 93% time savings.

FORM GRINDING automatically
with rigid, accurate
DoALL Grinders.



PRECISION MEASURING
. . . assemble your own
measuring instruments

AUTOMATIC SURFACE GRINDING
. . . removing stock exactly
to handwheel setting.

CUTTING GRINDING RELIEFS
. . . job done in ¼
former time.

DoALL

The DoALL Company, Des Plaines, Illinois, U. S. A.

Representatives in Principal Cities Throughout the World

PRODUCTION BAND MACHINING

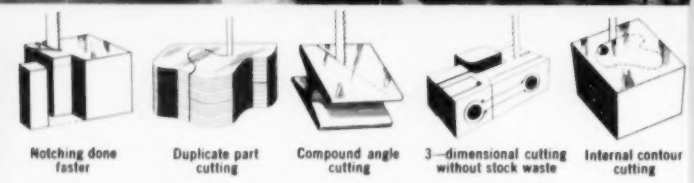
DoALL CONTOUR-MATIC MACHINES

. . . Newest of the basic machine tools

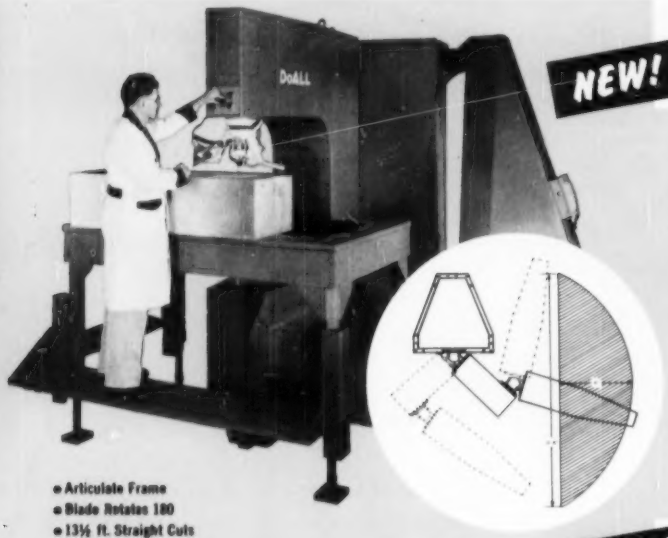
DoALL Contour-matic band machines offer time and cost savings up to 50% and more on jobs formerly done by milling machines, shapers, planers and even lathes. An automatic hydraulic power feed table carries the work into the continuous-cutting saw blade. An integral recirculating coolant system and air jet clean the teeth to promote high cutting rates. Infinitely variable table feeds and saw speeds provide maximum cutting efficiency on any job.

On the band machine you can cut any material from aluminum to titanium, from glass to plastics. Downward cutting force minimizes fixturing so that setups are simple. Versatility is great because the band machine cuts in any direction at any angle regardless the length of cut. Cutting rates are far greater than with other machine tools because the thin band tool "slices" out the material to be removed instead of reducing it to a pile of chips.

WRITE FOR CONTOUR-MATIC LITERATURE



Notching done faster | Duplicate part cutting | Compound angle cutting | 3—dimensional cutting without stock waste | Internal contour cutting



- Articulate Frame
- Blade Rotates 180
- 13½ ft. Straight Cuts
- Floating Power Head

NEW!

DoALL Model 43 Contour Machine

a new concept in Band Sawing . . . Guide the tool instead of the work!

Here's the answer to contour sawing on the big jobs beyond the weight, size and shape limitations of fixed head machine tools. Fixturing problems disappear and complete ease and maneuverability is within the hands of your operator with Model 43: A floating, power driven sawing head rotates the blade 180° in either direction over a 50 sq. ft. working area to perform contour cuts of any complexity. The fast, continuous-cutting saw band of high-speed steel removes complete sections of metal. Contour cuts in forgings, dies and bolsters —stack sawing of large area plate, are just a few of the big jobs you can do faster—at *big* material savings, with this new machine.

WRITE FOR LITERATURE ON MODEL 43

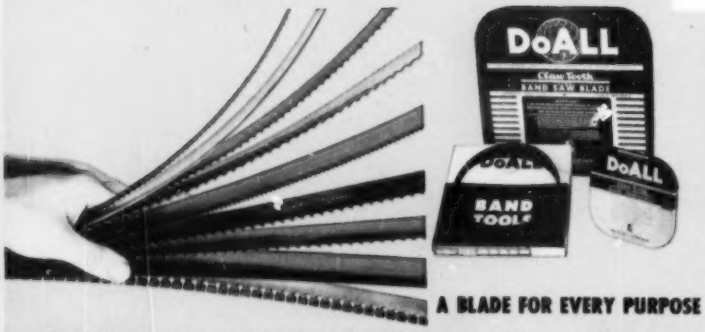
NEW!

DoALL *Demon* SAW BANDS

. . . made of *high speed* steel

For years, industry had sought a *high speed steel* saw band that would permit cutting rates far in excess of those possible with standard carbon steel blades. DoALL *Demon* HSS bands are the answer. They withstand temperatures up to 1100°F without losing tooth hardness. As a result they will cut up to 6 times faster and last up to 10 times longer than carbon steel saw bands. They are the cutting tools specified for all of the machines pictured here.

WRITE FOR SAW BAND LITERATURE



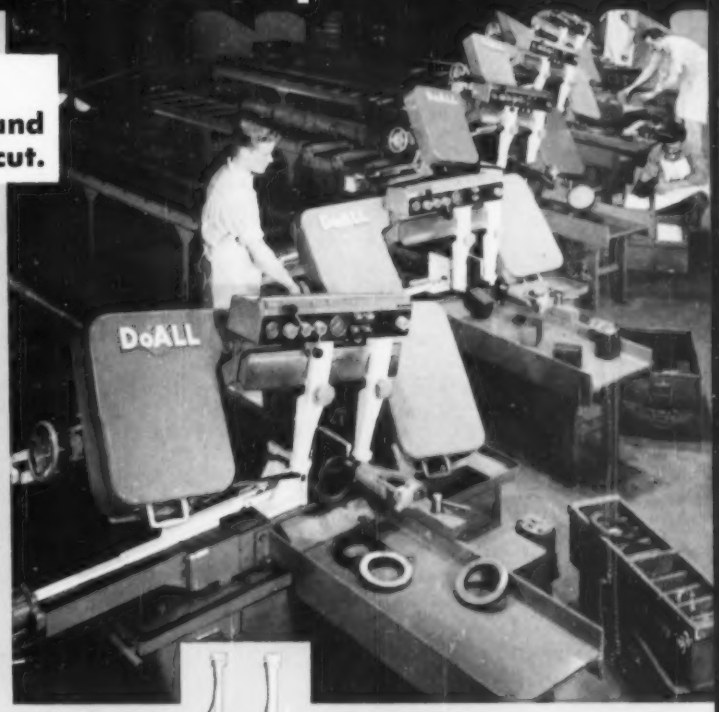
A BLADE FOR EVERY PURPOSE

In addition to high speed steel saw bands, DoALL makes 18 types of band tools in more than 300 type-width-pitch-set combinations for sawing, slicing, filing, grinding and polishing any material.

. . . An Entirely New Concept

DoALL POWER SAWS

50% faster cutting, greater accuracy and less stock waste at lowest cost per cut.



Here's an unbeatable combination of continuous-cutting efficiency and economy. DoALL Power Saws using new DoALL *Demon* high speed steel blades cut faster than any machine of comparable price and capacity—including power hack saws. Automatic band tension, machine rigidity and precision alignment provide cost cutting accuracy. You get automatic, constant feed pressure and automatic cycle stock indexing and sawing. High capacity built-in coolant system insures good finish and tool life. Cost of high speed steel blade is offset by time saved in cutting and *considerable* materials saving realized by thin kerf cut by *Demon* Blade. Specifically, they will cut up to 6 times faster and last up to 10 times longer than ordinary blades for comparable use.

Reduce cut off time and expense with DoALL Power Saws—and you reduce the cost of your *first step* in mass production!

WRITE FOR POWER SAW LITERATURE

DoALL 1824 Heavy Duty HORIZONTAL Cut-off Saw

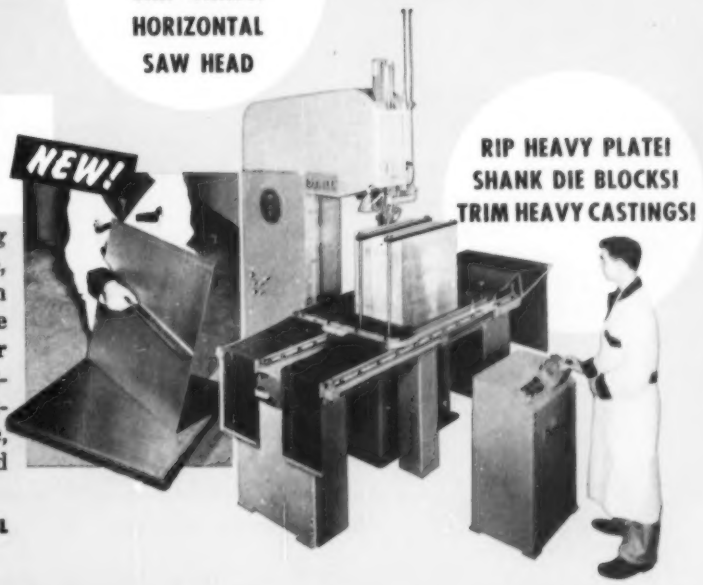
The DoALL Model 1824 is designed to provide positive rigidity for high speed, dead accurate slabbing, cropping, notching, etc. The sawing head is horizontal at all times. Movement is hydraulically controlled. Cutting rate is constant and automatically maintained. Variable speed, fluid drive provides cuts at speeds to fit a broad range of requirements. Reversible conveyors, automatic chip removal and complete automatic control are all included at a cost unmatched by any machine for similar applications.

WRITE FOR LITERATURE ON MODEL 1824

For STEEL MILLS! SHIP YARDS! HORIZONTAL SAW HEAD

DoALL Heavy Duty Band Mill

Walks through out-size jobs with Band Machine economy.

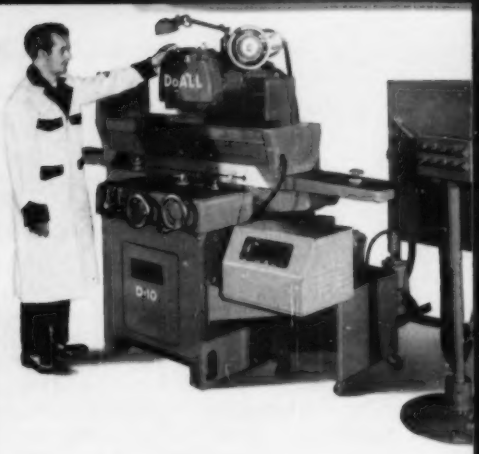


Here's a band machine built to meet increasing need for accurate, straight mill-type cuts on large, hard-to-handle work pieces. A 40"-stroke table on hand-scraped, lubricated ways plus fluid drive table feed with speeds controlled to .100 inch per minute, give you a new ease in bringing big, out-size jobs to and from the fast cutting head. Employs 2" high speed steel *Demon* blade for true, straight, continuous-cutting. Variable blade speed range: 55 to 10,000 FPM.

WRITE FOR LITERATURE ON BAND MILL

RIP HEAVY PLATE! SHANK DIE BLOCKS! TRIM HEAVY CASTINGS!

NEW PRECISION GRINDING...



DoALL Precision Surface Grinders Remove Stock Exactly to Downfeed Calibrations— Grinds Faster Without Burning Work

The amount of work that can be produced per hour on a surface grinder depends upon its accuracy. To grind, measure and then grind some more to secure final dimension is a costly waste of time. With a DoALL Grinder you eliminate this loss because you can trust its feed calibration in terms of stock removal.

The rigidity, precision and power of DoALL Grinders assures smooth table travel, eliminates deflection in table and spindle. This assures accurate work. Added to this is the DoALL "Cool-Grinding" and flood coolant attachment which prevents excessive thermal expansion of the workpiece.

With DoALL "Cool-Grinding" work warpage, burning and cracking are eliminated. In DoALL "Cool-Grinding" coolant is fed to the sides of the wheel. Centrifugal action pulls it *through* the wheel and out as a fine mist at the point of cut. This keeps the workpiece from overheating at the point of cut where the heat is generated. Flood cooling is also provided to regulate overall temperature of the workpiece. When operator visibility is paramount, the flood cooling can be shut off and "Cool-Grinding" used alone. It does not obscure visibility of the work so that costly "dry" grinding is never necessary.

Choose from 7 models of DoALL Grinders: 6" x 18" to 10" x 30" —wheel sizes from 7" to 14".

WRITE FOR GRINDER CATALOG

DoALL MICROTOMATIC Model MTA-6

. . . for accurate slicing and dicing of semiconductor materials for transistors, such as germanium and silicon. For precision slotting and parting of any hard, tough or brittle material.

NEW MEASUREMENT ACCURACY...

NOW AVAILABLE "A" Grade Gage Blocks for the price of "B" Grade Blocks

Sweeping aside many of the barriers to perfect dimensional measurement is the production achievement by DoALL Gage Engineers that now establishes at lower prices entirely new dimensional standards for rectangular and square gage blocks. As shown below gage blocks now have optical surface finish of 0.09 RMS and accuracy up to one millionth of an inch.

Metric 40 and 48 piece rectangular gage block sets are available in the A grade accuracy.

New Standards for DoALL Gage Blocks

Grade	Tolerance per inch of length	Flatness	Parallelism	Surface Finish Microinches RMS
"AAA"	+.000001 −.000001	.000001	.000001	0.09
"AA"	+.000002 −.000002	.000002	.000002	0.09
"A"	+.000004 −.000002	.000004	.000004	0.09

WRITE FOR BOOKLETS

1—"How to be Your Own Bureau of Standards."
2—How to assemble gage blocks into precision measuring gages.
3—"Assured Accuracy Through Dimensional Quality Control."

DoALL

THE DoALL COMPANY

Des Plaines, Illinois • U. S. A.

makers of Band Machines and Blades—*they go together.*

Representatives in Principal Cities Throughout the World

Form No. 56-65 11-56

Litho in U.S.A.

MORE PRODUCT DIGEST

Ball-Shaped Radio

A new five-tube spherical shape radio is said to provide sound in all directions. Special features include a speaker cone made from bamboo fiber. The sound volume is described as three times that of ordinary speakers.

The speaker is directed downwards, giving the same degree of sound in all directions through a special resounding device. Earphones can be used. The radio weighs two kilograms. **(Tokyo Shibaura Electric Co., Ltd., 2 Ginza Nishi, 5-Chome, Chou-Ku, Tokyo)**

●

Two-Section Carriage Makes Even Margins

Margins are adjusted automatically with this new typewriter. The carriage, divided into two sections which move relative to each other, allows cam driven linkage to change letter spacing and make margins even.

A draft is typed first, and the positions of line-endings are read from the scale on the overhead bail (photo above). This scale is divided into four sections, one for each side of the slotted stop-column. Each line of copy is then retyped with rail-setting lever and stop-column set to a scale reading taken from the bail.

The lower carriage section rides on rollers in slots in the drive rack, and is pulled toward the left end of the slots by a spring. Upper and lower sections are connected by linkage positioned with a cam follower, which rides a guide rail pivoted in the frame. The guide rail angle is set by positioning the rail-setting lever in slots in the stop-column. The carriage then automatically adjusts the spacing between words. **(Adlerwerke vorm (H.), Kleyer K. G., Kleyestr. 17, Frankfurt am Main, Germany)**

●

High-Speed Collater

In an office where many sheets of paper have to be collated regularly, the Metromatic Series II electric collating machine is claimed to save time, space and money. Hand collating requires the use of a fair-sized table or tables. The portable Metromatic fits in one corner of the average desk.

Sheets to be collated are stacked in vertical columns of trays. The machine is power-operated and foot-controlled. Depression of the foot pedal ejects the top sheet of each stack, ready for gathering.

The collater will handle all kinds of paper. It enables a constant check to be kept on every collated set so that blank or misprinted sheets do not slip through. **(The Metro Duplicator Supply Co. Ltd., 57 Holborn Viaduct, London, E.C. 1, England)**

Photograph by courtesy of The Automatic Telephone Co. Ltd., Liverpool

The Fraser Tuson Vulture Scrubber and Polisher being used in its scrubbing role in conjunction with the Dipper Suction Drier leaving the floor perfectly clean, dry and ready for use.

DESIGNED AND MANUFACTURED BY

Cimex-Fraser Tuson Ltd.

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CLARK EQUIPMENT
moves mountains . . .

. . . of manganese ore

From stockpile on an Arizona hillside, this Michigan Tractor Shovel hauls manganese ore out on the trestle, dumps it into a crusher hopper With hopper filled, clean-up chores keep the Michigan on the go This rugged, powerful, easy-to-operate machine is a champion time-and-money-saver on countless operations involving bulk materials.

. . . of heavy machinery

In the free-port of Copenhagen, this compact Clark truck handles awkward pieces of cement-making machinery on their way to Denmark's export markets. In several foreign countries, Clark has licensed manufacturers to produce many of the models in the Clark line.The world over, Clark sets the standards for materials handling equipment.

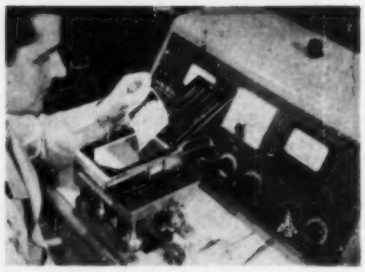
CLARK EQUIPMENT INTERNATIONAL, C.A.

CLARK® EQUIPMENT

BUCHANAN 4, MICHIGAN, U. S. A. Cable: Interclark

Associated Manufacturers in Australia, Belgium, France, Germany and U.S.A.

MORE PRODUCT DIGEST



X-Ray Microscope

This new research microscope is designed to show hidden objects such as contaminants in chemicals, foreign materials in metals, and the internal structure of processed foods. An X-ray microscope, it also makes possible examination of specimens in three dimensions.

Magnifying power of the new microscope is not nearly so high as that for electron microscopes. But it has these advantages: It reveals structures not otherwise visible, does not require vacuum-mounting of specimens or other special preparation. **(International General Electric Corp., 150 E. 42nd St., New York 17, N. Y., U.S.A.)**

●

Protection for Heavy-Duty Motors and Generators

An "integrated" field coil with a newly developed insulating system is designed to protect electric motors and generators against atmospheric contaminants and destructive mechanical forces. Called the "integrated" field coil because the finished coil and pole structure is securely locked together in an integral unit, the coil is applicable to both alternating current and direct current rotating machines.

"Integrated" field coil construction is particularly well suited for applications requiring chemical resistance, oil and moisture-proofness, or sealing against atmospheric contaminants such as carbon black, dust and dirt found in many industrial plants.

The system is now available in Allis-Chalmers motors and generators. **(Allis-Chalmers Manufacturing Co., Export Dept., Milwaukee 1, Wisconsin, U.S.A.)**

From Germany: A Big, New Luxury Coach

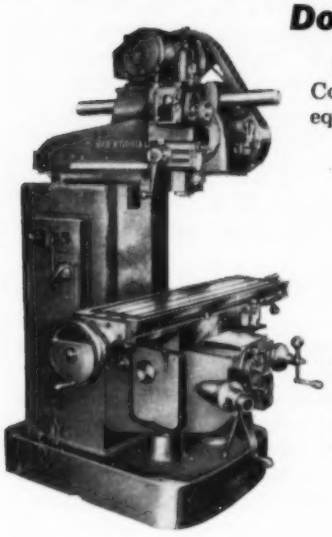
For passenger comfort nothing has been left undone in the Golden Eagle. Air conditioning and tinted glass windows keep the interior cool and comfortable. The 41-passenger coach is also fitted with a complete rest room, stainless steel snack bar, coffee-maker, food-warmer, and all the requirements for light refreshment service.

Mechanical features of the bus include a new hydraulic constant-leveling device, which enables the bus to take a curve with hardly any body sway. A supplementary shock absorber system completes the smoothness of the ride by eliminating road shock within the bus. Silencers lower engine noise.

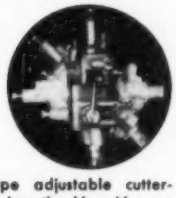
A 280-horsepower turbocharged diesel drives the bus through a six-speed transmission and electronic gearshift. **(Kussbohrer, Fahrbengwerke, GmbH., Ulm, Germany)**

VAN NORMAN COMBINATION MILLERS

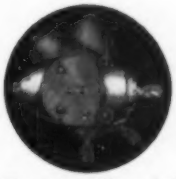
Do the Work of Two Single Purpose Machines



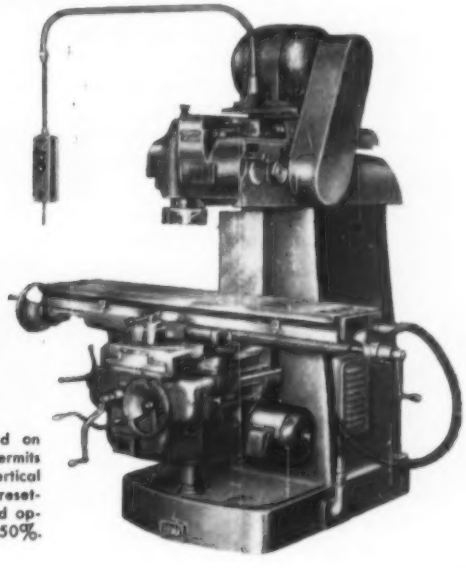
One investment in a Van Norman Combination Miller gives you the equivalent of 2 single purpose machines and attachments — and at the much lower cost of one machine. Designed and engineered for maximum rigidity, cutability and accuracy, Van Norman Combination Millers simplify milling operations, reduce milling costs.



Quill type adjustable cutterhead makes the Van Norman 16S the most versatile miller available. Permits horizontal, angular and vertical milling plus boring and drilling.



The adjustable cutterhead on the Van Norman 38MA permits horizontal, angular and vertical milling — minimizes work reset-ups, cuts idle machine and operator time by as much as 50%.

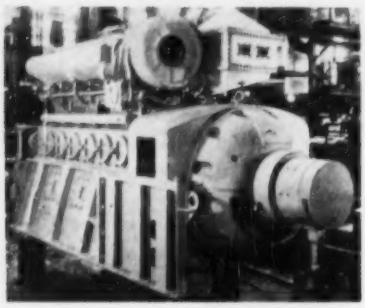


Write today for complete catalog.

VAN NORMAN MACHINE COMPANY

Division of Van Norman Industries, Inc.

SPRINGFIELD 7, MASS., U. S. A.



Diesel "Power Package" Comes Ready for Use

The W[illegible]ne is a small, heavy-duty, four cycle, compact unit available in a 400- to 1400-horsepower range—for auxiliary or main power in utility service, water works, chemical and petroleum plants.

Fully assembled upon delivery, the W9 "Power Package" is ready to be placed upon its foundation and requires no major aligning. The alignment is done at the factory, minimizing installation time and expense.

The Jet Swirl design involved swirls the air as it enters the cylinder, thus assuring a rapid mixture of air and fuel—resulting in efficient and clean combustion. **(Worthington Corp., Harrison, New Jersey, U.S.A.)**

•

Push-Button Scale

Automatic, distortion-free weighing of difficult adhesive materials is provided by a newly designed gross weigher. Automatic features of the scale include push-button control, automatic feed and bin level switches, and a choice of power feed mechanisms.

The E-52 scale feeds directly into a bag suspended from the weigh beam, rather than through a weigh hopper. This keeps material continuously in motion until it falls into the bag, eliminating material buildup and erratic discharge.

Besides handling such adhesives as carbon black, powdered sugar, powdered milk and starch, the new gross weigher will accommodate non-adhesive feeds, meal, food products and chemicals. It handles 25-pound to 100-pound bags at normal operating speeds of five or six bags a minute. Accuracy is reported at an average of one to two ounces. **(Richardson Scale Co., Van Houten Ave., Clifton, New Jersey, U.S.A.)**

•

Four New Chain Saws

Four new chain saws—two precision geared, two direct drive—feature functional streamlined design and a guide bar as standard equipment. The bar is made of wear-resistant, cobalt-chromium, tungsten-carbide alloy bonded with special, extra-hard alloy steel in the nose area. The mounting end is electrically hardened to resist wear where chain enters the groove. One precision-geared saw is recommended for cutting hardwoods; the other for pulping or cutting medium-size logs.

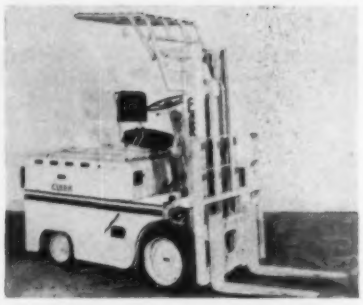
Strong, lightweight construction is achieved through use of magnesium castings. A multi-position handle, and "pivot-point" balance make for easy handling. **(Bolens Products Div., Food Machinery and Chemical Corp., Port Washington, Wisconsin, U.S.A.)**

•

Aircraft Sprays Crops

The Ag-2 airplane is claimed to be the first aircraft designed specifically for aerial application of chemicals to agricultural and forest lands. The airplane covers all phases of dusting and spraying of crops, control of noxious plants, restoration of forest lands, treatment of infected forests, seeding of eroded areas, planting of rice and other crops, and pest control.

For forest-fire fighting, the all metal Ag-2 has a multi-tank arrangement capable of carrying more than 250 gallons of water or chemicals for fire control. **(Transland Company, P.O. Box 45545, Airport Station, Los Angeles 45, California, U.S.A.)**



Battery-Powered Fork Truck

An 8,000 pound capacity fork truck, Model EUT-8024, is powered by a high-torque motor. The truck has a turning radius of 85 inches and an overall length of 133 inches —permitting right-angle stacking in an aisle 148½ inches wide (with a 48-inch-long load). Overhead welded pipe frame protects driver from falling objects.

With four speeds forward and four reverse, it will travel loaded at 5½ miles per hour and climb a 10% grade. A finger-tip directional control lever on the steering column controls first speed in each direction, and mechanically cuts off power and locks in neutral when the operator's seat is empty. Second, third and fourth speeds are attained by a foot accelerator operating a master control switch. **(Clark Equipment International, C.A., Buchanan 4, Michigan, U.S.A.)**

•

Heavy-Duty Marine Power and Steering Units

A new utility series of the Harbormaster outboard propulsion and steering units is said to offer practically all the advantages of standard Harbormasters at considerably lower cost. They are easily installed on new or existing craft such as barges, towboats, work boats.

Available in 40 and 60 horsepower gas or diesel models, the utility models provide outboard-style maneuverability, with propeller-thrust steering from 30° port to 30° starboard. The outboard drive section elevates above the deckline for repairs and maintenance. **(Murray & Tregurtha, Inc., 80 Hancock St., Quincy 71. Massachusetts, U.S.A.)**

High-Pressure Hose—New hose is useful for plant fire-fighters and storage supervisors and has 2-braid rayon reinforcement for a working pressure of 800 pounds per square inch. Two sizes: ¾ and 1 in. ID. **(Thermoid Co., 400 Whitehead Road, Trenton 6, New Jersey, U.S.A.)**

●

Industrial Engine—Model CV4-180 air-cooled industrial engine has 4 cylinders and develops 70 horsepower at 3000 revolutions per minute. It has a complete complement of accessories and is especially suited to field requirements demanding a rugged power unit. **(Lycoming Div., Industrial Sales, Avco Manufacturing Corp., Williamsport, Pennsylvania, U.S.A.)**

●

Isotope Radiography Machine—The low-cost, portable 50-curie Multitron, utilizes Gamma energy from radioisotopes to detect flaws in castings, welded joints on boilers, pressure vessels, pipelines, etc. It requires no power supply and can be wheeled by one man. **(The Budd Co., 2535 Hunting Park Ave., Philadelphia 32, Pennsylvania, U.S.A.)**

●

Magnetic Forks—Stacked steel plates will not slip off the forks of a new industrial lift truck. The truck has an electromagnet between the tines of the fork lift mechanism which magnetizes the entire stack of plates, keeps them from sliding around or tipping off. **(Yale & Town Manufacturing Co., 11000 Roosevelt Blvd., Philadelphia, Pennsylvania, U.S.A.)**

●

Demountable Wheel—Ten-inch diameter wheel makes replacing tires a simple, 5-minute job—just replace tire ring, instead of remolding entire tread. Tire's metal back will not collapse under heavy loads. **(Rapids-Standard Co. Inc., Rapistan Building, Grand Rapids 2, Michigan, U.S.A.)**

Espresso Coffee Machine—Hot water, pressed by steam from the top of the machine through the ground coffee, results in a strong, smooth liquid. A small fine coffee sieve offers the same resistance regardless of the quantity of ground coffee used. Suitable for continuous use, the machine can fill as many as 30 cups per hour. **(Stella Maschinen Co., Sonnenstrasse 18, Munich, Germany).**

●

Coats with Plastic—Neutralith-W 56, a new plastic coating lines steel, concrete, and other metal containers with plastic. The coating consists of two components: a polyester and hardener which through chemical reaction and a catalvst hardens the liquid foil within 2 hours. Neutralith-W 56 has a smooth surface that can be easily cleaned. It is resistant to acids, alkalis, various other chemicals. **(Fritz Krick Co., Frankfurt, Germany)**

●

"Tape Master"—Machine unrolls, cuts, and applies pressure-sensitive tape to protect polished metal sheets—takes only 1 minute per side to cover 12-foot sheets. One model is designed for multiple widths up to 4 feet, another for widths up to 5 feet. **(Minnesota Mining & Mfg. Co., 1000 Fauquier Avenue, St. Paul 6, Minnesota, U.S.A.)**

●

Electro-Mechanical Counter—Device tabulates and records a weighing process from any point in the plant. Clutch drive permits recording up to 200 weighings per minute, prevents "double count." **(Richardson Scale Co., Van Houten Avenue, Clifton, New Jersey, U.S.A.)**

GIANT COLLAPSIBLE TANKS

have successfully completed tests under actual operating conditions. They are made of tough, rubberized nylon, and have a 15,000-gallon capacity. When filled, they measure 45 feet long, 11 feet wide, and 6 feet high. As the photo at the right shows, they can be rolled up like a sleeping bag into a package 8 feet long by 2½ feet. Tanks will contain most liquids.

The tanks are designed to avoid some of the transportation and storage problems of steel tanks. Rupturing from overloading is impossible because of a built-in pressure release. **(Firestone International Co., Akron 16, Ohio, U.S.A.)**

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Americans Build a "Bus of Tomorrow"

Designed by world-famed industrial designer Alexio De Sakhnoffsky, the "bus of tomorrow" is painted in metallic bronze with white trim. The bus features a "plunging waistline" with wrap-around windshield. The side windows are the largest ever produced for a bus, and air conditioning, interior foam rubber crash padding, and a radio telephone are also provided.

To make the rear of the bus more desirable, and encourage people to move in that direction, the seats have been placed around the walls to form a lounge. This lounge is further accented by the use of a different colored upholstery than the rest of the bus.

The bus was built as an exploratory venture in the field of transport design. Many of the ideas built into it were based on the suggestions of bus operators. **(Mack Motor Truck Corp., 350 Fifth Ave., New York, New York)**

Full Line—
A hack saw blade—every type, size and pitch—for every material and cutting condition.

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Because you have your choice from a full line, you always get the right blade for the most economical operation.

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Twin-Power Scraper

Model TS-18 Euclid Twin-Power Scraper, with overhung engine design, has a struck capacity of 18 cubic yards and utilizes separate Torqmatic Drives for each of its two engines. Torqmatic Drive eliminates clutching and permits changing from one speed range to another under full power.

A total of 436 horsepower, and four-wheel drive, give the TS-18 the power and traction required for self-loading in any scraper material, and for fast travel speeds on steep grades. **(General Motors Overseas Operations, 1775 Broadway, New York 19, N. Y., U.S.A.)**

●

Desktop Recording Oscillograph—Recording oscillograph for many electronic testing and recording jobs can handle six electronic channels at a time and record their characteristics—as they would show up on an oscilloscope—on a paper strip. **(Heiland Div., Minneapolis-Honeywell Regulator Co., 2945 Fourth Ave., S., Minneapolis 8, Minnesota, U.S.A.)**

YOUR MANAGEMENT READING

Management Digest's editorial staff here again does the "worthwhile reading" for you to save your time. For the following literature, please write on your company letterhead directly to the address given, mentioning Management Digest.

New Studies from OEEC—The following publications of the Organization for European Economic Cooperation are just out, or in preparation. "Titanium and Zirconium." Price: $1.50, 10/-, or 500 F. fr. . . . "Market Research Methods in Europe." Price: $1.50, 9/-, 450 F. fr. . . . "Selection and Training of Foreman In Europe." Price: $2.00, 12/6, 650 F. fr. (Organization for European Economic Cooperation, 2 Rue Andre Pascal, Paris 16, France.)

Moving Materials?—The "Materials Handling Manual" is a valuable source of techniques covering plant layout and operation, warehousing, shipping and receiving, materials-handling. Price: $5.00. (Boston Publishing Company, Inc., 795 Boylston Street, Boston 16, Massachusetts.)

Making Money?—"Financial Planning In Industry," by H. O. Goldschmidt, takes a theoretical approach to financial management. The author analyzes the factors within an enterprise that determine the need for capital, constructs rules to guide a financial program. Price: F.22.80. (H. E. Stenfert Kroese N.V., 38 Pieterskerkhof, Leiden, Netherlands.)

Buying Advertising?—"Costing for Advertising" sets out to answer the basic question "How much should we spend and what shall we get for our money?" The author explains how both the selling price of an item and percentage per item, spent on advertising can be reduced—while profits rise. Price: 12s. 6d. (or $1.75). (Bailey Brothers & Swinfen, 46 St. Giles High Street, London WC 2, England.)

Good Books and Films—"The Management Bookshelf" is a new, revised catalog of publications covering all phases of management. (Publication Service, American Management Association, 1515 Broadway, New York 36, New York.) . . . United World Films Inc. has published a catalog listing 457 training films for industrial workers, and for agriculture and health programs. They are now available for re-recording into any language. (United World Films, Inc., U. S. Government Film Dept., 1445 Park Avenue, New York 29, New York.)

Bulletins from Industry—"Aus Produktion und Entwicklung" (available in German and English) describes AEG activities in electrical energy, transportation, appliances, and portable power tools. Other publications of the German electrical manufacturer provide data on turbo-generator sets, hydro-electric generators and three-phase and single-phase a.c. motors. (Allgemeine Elektricitats-Gesellschaft, Hohenzollerndamm 150, (1) Berlin-Grunewald, Germany). . . . Cut-away and detail drawings, in color, mark this catalog of prefabricated industrial and commercial buildings. (Stran-Steel Corporation, Ecorse, Detroit 29, Michigan). . . . "Casting Design As Influenced By Foundry Practice" describes techniques of pattern-making, molding procedure, metal characteristics, and other crucial elements involved in the production of dependable engineering castings. (Meehanite Metal Corp., 714 North Avenue, New Rochelle, New York.)

Care & Feeding of Engineers—Every phase in the management of professional employees is outlined in "Supervision of Scientific and Engineering Personnel": building and maintaining a good technical team, appraisal of performance, salary administration. Price: $8.75. (California Institute of Technology, Industrial Relations Section, Pasadena, California.)

Publications Digested

McGraw-Hill Publishing Co., Inc., 330 W. 42nd St., New York 36, N. Y.

American Automobile
American Letter
American Machinist
Aviation Week
Business Education World
Business Week
Bus Transportation
Chemical Engineering
Chemical Week
Coal Age
Construction Methods & Equipment
Control Engineering
El Automovil Americano
Electrical Construction & Maintenance
Electrical Merchandising
Electrical West
Electrical Wholesaling
Electrical World
Electronics
Engineering & Mining Journal
E&MJ Metal & Mineral Markets
Engineering News-Record
Factory Management & Maintenance
Fleet Owner
Food Engineering
Industrial Distribution
Ingenieria Internacional Construccion
Ingenieria Internacional Industria
Metalworking Production (London)
National Petroleum News
Nucleonics
Petroleum Processing
Petroleum Week
Power
Product Engineering
Textile World
Today's Secretary

American Builder, Marine Engineering, Railway Age, Railway Track and Structures, Railway Locomotive and Cars, Railway Signaling & Communications
Simmons-Boardman Publishing Corp., 30 Church St., New York 17, N. Y.

American Business
Dartnell Publications, Inc., 4660 Ravenswood Ave., Chicago 40, Ill.

Architectural Record
F. W. Dodge Corp., 191 W. 40th St., New York 18, N. Y.

Banking
American Bankers Association, 12 E. 36th St., New York 16, N. Y.

Business
Business Publications Ltd., Mercury House, 109-119 Waterloo Road, London

Ceramic Industry
Industrial Publications, Inc., 5 South Wabash Ave., Chicago 3, Ill.

The Controller
Controllers Institute of America, Inc., Two Park Ave., New York 16, N. Y.

The Economist
The Economist Newspaper, Ltd., 22 Ryder St., London

Harvard Business Review
Harvard University, Soldiers Field, Boston 63, Mass.

Heating, Piping & Air Conditioning
Keeney Publishing Co., 6 N. Michigan Ave., Chicago 2, Ill.

Industrial Marketing
Advertising Publications, Inc., 200 E Illinois St., Chicago 11, Ill.

The Management Review, Personnel, Supervisory Management
American Management Association, 1515 Broadway, New York 36, N. Y.

Metal Progress
American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio

Modern Packaging, Modern Plastics
Breskin Publications, 575 Madison Ave., New York 22, N. Y.

The Oil and Gas Journal
Petroleum Publishing Co., 211 S. Cheyenne Ave., Tulsa 1, Okla.

The Paper Industry
Fritz Publications, Inc., 431 S. Dearborn St., Chicago 5, Ill.

Petroleum Press Service
Petroleum Press Service, 91 & 93 Bishopsgate, London

Plastics, The British Motor Ship
Temple Press Ltd., Bowling Green Lane, London

Printers' Ink
Printers' Ink Publishing Co., Inc., 205 E. 42nd St., New York 17, N. Y.

The Rubber and Plastics Age
Rubber and Technical Press, Ltd., 147 Grosvenor Rd., Westminster, London

Sales Management
Bill Brothers Publishing Corp., 386 Fourth Ave., New York 16, N. Y.

The Times Review of Industry
The Times Publishing Co., Ltd., Printing House Square, London

Welding Engineer
Welding Engineer Publications, Inc., 12 East Grand Ave., Chicago 11, Ill.

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At Burroughs' London office Stark received further training and served as an instructor. In 1950 he returned to Zurich as a Burroughs sales representative. And last year he was appointed zone sales manager in the Zurich branch.

Camille Stark's customers—large Swiss firms, banks and government agencies—owe much to his ability to apply the latest business methods and machines to their management problems. And Stark's knowledge of four languages—English, French, German and Italian—has been an invaluable asset in this country where the four languages are spoken.

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